Working environment and occupational safety among industrial workers in Vietnam

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ABSTRACT

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Introduction: Industrialization becomes a global trend for the past decade. Undeniably, the industrialized has helped the economic growth in both high-income countries and low-middle income countries. This expanded bring many economic benefits for those countries as well as increase of the national income, created more jobs for populations, improve the quantitative and qualitative of products with the faster technologies. However, ensuring the sustainable development of those industrialized countries, especial low-middle income countries become obstacles to manage the safe working condition and protect worker's health. The number of occupational accidents and work-related ill are increasingly worldwide. In developing countries, workmen have to work under the unbearable working condition, poor physical environment such as poor air quality, unsanitary. Similarity, in Vietnam, the rapid industrialization also increases the number of work-related accidents. Workers not only have to work under

the toxic environment, but also have to receive low income which is unstable and insufficient for their living cost. Moreover, many studies from other countries indicated the negative relationship between poor working conditions and low productivities. Whereas, the unsafe physical working conditions may affect both physical and mental disorders of the workmen and also need to improve. While previous research showed a higher prevalence of chronic diseases such as low back pain, musculoskeletal disorders among workers. Furthermore, lower quality of life and more severe depression condition also observed in this population. Therefore, we conduct this study to update the current working condition in industries factory in Vietnam and investigate the associated factors to the health status of labourers.

Methods: We conducted a cross-sectional study in 4 cities in Vietnam from January to Jun of 2019. A total of 1200 participants enrolled in our study. We used the convenient multistage sampling method to recruit respondents. Chi-square test, Tobit regression were used to investigate the associated factors to workers' health.

Results: Our findings showed the high prevalence of hazardous exposure at workplaces among workers. About 80% of our sample reported they have to expose to hazards at their factories. Moreover, the results from this study also indicated a significant higher chance of having depression

among workmen with problems in physical health. Besides, we also observed the lower quality of life on workers with inadequate awareness and inadequate access to policies and procedures on workplace safety. Our study further highlights the importance of improving working conditions to enhance the worker's health.

Conclusion: Our study results indicated the current working condition in factories in Vietnam needs to improve to be safer. These results will raise attention from the political and government to focus more on managing the endanger risk at workplaces and develop the specific education program for workers on safety behavior and identify the risk factor at workplaces.

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Contents

1. Introduction…….. 1
2. Literature review……. 4
2.1 Definition…… 4
2.2 Law on Occupational Health and Safety in Vietnam……. 5
2.3 Working condition of industrial zones…… 8
2.4 Factor associated with the health status and quality of life of workers……. 9
2.5 Study objectives……. 11
2.6 The necessity of the study……. 12
3. Methodology……. 12
3.1 Study design and sample size……. 12
3.2 Survey method and instruments……. 14
3.3 Data management……... 14
3.4 Statistical analysis…….. 19
3.5 Ethical consideration…….. 19
4. Results…….. 21
5. Discussions…… 58
5.1 Working environments and occupational health safety in industrial factories in Vietnam…….. 59
5.2 Health status, depression and associated factors among industrial workers…….. 63
5.3 Health-related quality of life among industrial workers and associated factors…… 67
5.4 Limitations……. 72
6. Conclusion…… 74

List of Tables

Table 1. Demographic characteristic of respondents……. 21

Table 2. Chemicals and hazardous materials storage……. 25

Table 3. Distribution of hazards exposure at the workplace…….. 27

Table 4. Health status of workers who exposure to hazards…….. 30

Table 5. Policies and procedure at the workplace…….. 31

Table 6. Distribution of adequacy of policies and procedure at the workplace……. 33

Table 7. Occupational health and safety awareness…….. 36

Table 8. Distribution of adequacy awareness about occupational health…… 37

Table 9. EQ-5D index and EQ-VAS according to demographic characteristic of respondents…… 39

Table 10. Distribution of inadequate policies and procedure, inadequate awareness, and inadequate empowerment by hazard exposure….. 42

Table 11. Univariate logistic regression for health problem……. 43

Table 12. Univariate logistic regression for health symptoms……. 47

Table 13. Univariate logistic regression for mental health……... 51

Table 14. Factors associated with the health status of industrial worker……. 53

Table 15. Factors associated with EQ-5D index and EQ-VAS in industrial workers……. 57

List of Figures

Figure 1. Occupational health system in Vietnam…….. 7

Figure 2. Feeling of worker about their job……. 24

Figure 3. The proportion of workers exposed to hazards by sex……. 27

1. Introduction

Workers' health is an essential factor, contributing to promoting the production and business development of enterprises. Currently, there are 332 industrial factories in Vietnam with over 2.3 million workers, of which the rate of female workers is very high. For instance, some industries such as seafood processing, garment and leather shoes, the ratio of female workers up to 80%[1]. Most labor productivity in industrial zones is those under 35 years old; approximately 70% of workers migrate from rural areas to seek employment [2]. After the New Millennium, Vietnam made the capital of high-income countries and took opportunities to promote economic growth. Nowadays, Vietnam successfully transformed to a developing country in almost twenty-five years [3]. Since 2001, the Hansae company started operating its infrastructures and manufactured products for several foreign brands with various goods such as toys, clothes, electronics or shoes in Vietnam [4]. After fifteen years, the size of each factory increased by up to one million workers, and they have to follow the national labors legislation and law, international standards in safety working environment at the workplace [4]. Besides the benefit of the increasing gross domestic product, applied a high-technology technique, and infrastructures from non-refundable aid, it also raised the challenges for the Vietnamese

government to ensure sustainable development. In other words, the modernization period helps to increase product quantity and save more time. However, workers have to overcome many obstacles from the new working environment, which are more pressure and more threatening to their health than before.

Employees in general, especially young workers in an industrial factory are working in high-pressure conditions on labor productivity and long working time. It well documented that young workers take higher risks of having a work-related injury than older workers [5, 6]. Living conditions of workers are also tight, lack of facilities and not hygienic [7]. Therefore, propaganda activities to improve knowledge, mobile health examination, and counseling for workpeople are crucial, helping them to improve their health and quality of life actively. Young workers in many industrial factories are still working in conditions that do not meet the standards of occupational safety and health. Also, due to psychological pressure, they have to work in dry and infectious conditions with other occupational harm factors such as noise, dust, high temperature, chemicals in the workplace [8]

In Vietnam, within the last five years, an average of 100,000 workers have been diagnosed with occupational diseases each year, and more than 5,000 cases have been detected [9]. Additionally, the proportion of employees receiving periodic health checkups remains low - on average,

only about 2-3 million people have been examined annually, accounting for approximately 6% of the 32.5 million labor contracts [9]. There are several reasons leading to the limit of taking the medical examination for young workers. For instance: the cost of medical examination at hospitals is quite pricy, the procedure for health insurance also is still cumbersome, and the workers have to work according to production lines and over time, so there is no time for periodic medical examination and treatment. There are still a part of young workers who are not allowed to participate in social insurance, so they must take care of their own health [10]. Earlier works have examined the effect of occupational diseases on workers' health; however, there are still few studies showing the overall perspective of this issue and update the current situation working environment in industrial factories in Vietnam. Moreover, in the periods from 2005 to 2014, the number of occupational accidents were increasing sharply [11]. Nearly 7000 injuries were attribute to work [11]. We conduct this study to describe the current physical working environment and occupational safety in industrial factories in Vietnam and the impact of workplace environment on the occupational health outcome. Besides, our hypothesis is the unsafe working condition may affect worker's health and quality of life. Results from our study could assist in workplace management to enhance the working environment as well as improve the health status of workers.

2. Literature review

2.1 Definition

According to the Vietnamese law with the title "The law on Occupational safety and health" [12] (Law No.84/2015/QH13) published by The National Assembly Socialist Republic of Vietnam, this law provides information to measure the OSH, rights and responsibility of organization and individuals in OSH and some definitions related to the OSH which are describe below.

Occupational safety means measures to prevent and combat the impact of critical factors to ensure that no illness or death occurs to people during the working process.

Occupational health means measures to prevent and combat the impact of dangerous factors that may cause diseases and decrease people's health during the working process.

Dangerous factor means a factor causing unsafe situations, injuries or death to people during the working process.

Hazardous factor means a factor have causal relationship with diseases or affect the health of labourer during their working day.

Working environment monitoring means collected, analyzed and evaluated the data to measure factors in the workplace condition to reduce the harmful effect to worker's health and prevent and combat occupational diseases.

2.2. Law on occupational safety and health in Vietnam

In 2015, the Vietnamese government had developed the law on Occupational Safety and Health (Law No.84/2015/QH13) [13]. This Law provides information for measuring the occupational safety and health, policies to protect health-related occupational accidents and diseases. Besides, this Law also mentioned the responsibilities and rights of both organizations and workers to ensure the safety of working conditions at the workplace. The law on Occupational Safety and Health includes seven chapters as well as (1) General Provisions; (2) Measures to Prevent and Control Hazardous Factors and Toxic Factors for Workers; (3) Measures to Settle Technical Incidents Causing Occupational Safety and Health Failure and Occupational Accidents and Diseases; (4) Guarantee of Occupational Safety and Health for Special Workers; (5) Guarantee of Occupational Safety and Health in Production and Business Establishments; (6) State Management of Occupational Safety and Health; (7) Implementation Provisions. Especially, in 2017, The National Assembly Socialist Republic of Vietnam published the Decision No. 26/2017/TT-BLDTBXH on the Regulations and guidelines for the implementation of compulsory labor

accident and occupational disease insurance. This Decision indicated that workers have to compulsory labor accident and occupational disease insurance include: officials in cipher organization, officer and career military, those who work under indefinite-term labor contracts, definite-term labor contracts, seasonal labor contracts or a certain job with the period from 3 months to under 12 months; and person working under labor contracts between full 1 month and under 3 months.

- **Occupational Health System**

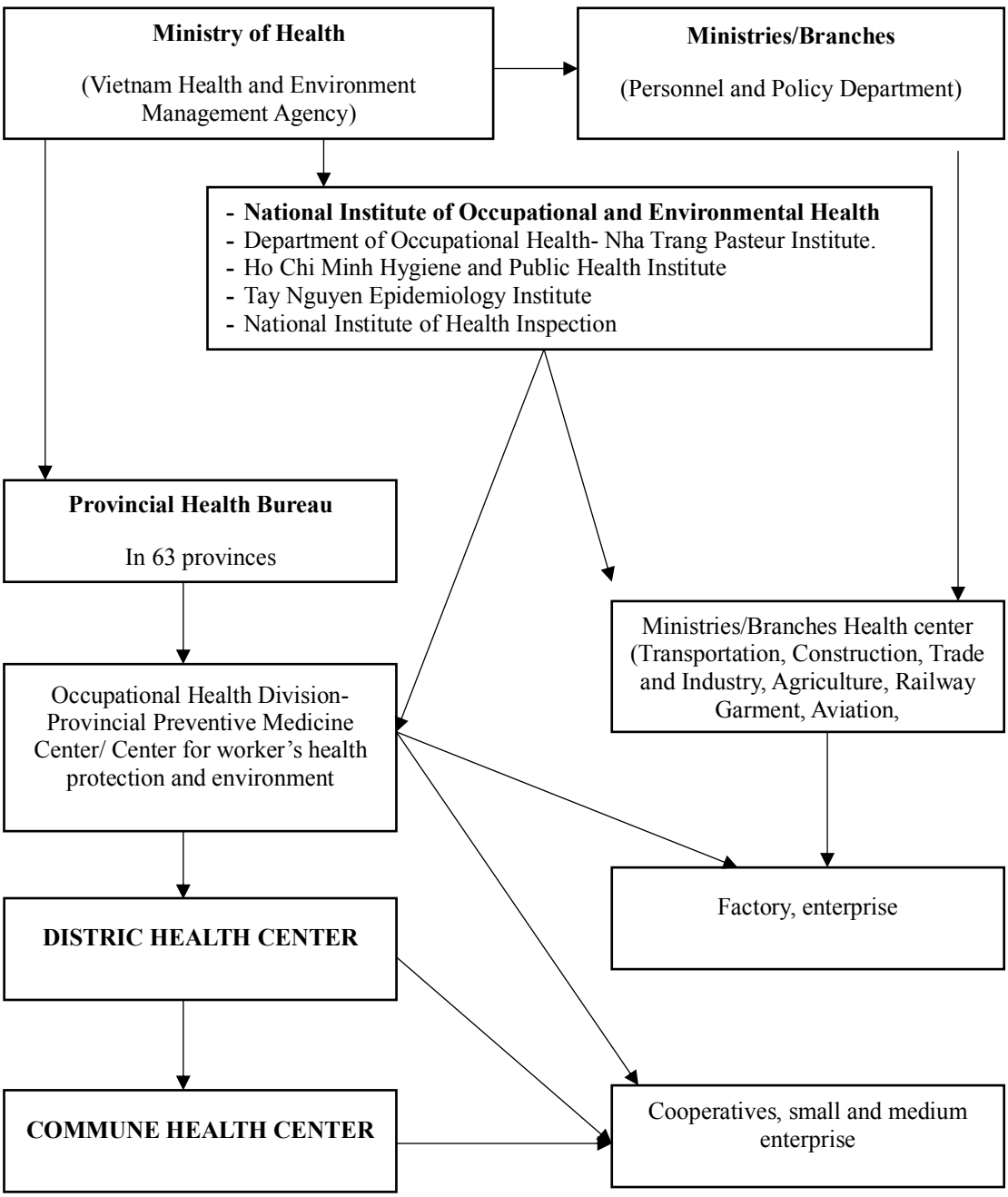
Ministry of Health
(Vietnam Health and Environment Management Agency)
Ministries/Branches
(Personnel and Policy Department)
- National Institute of Occupational and Environmental Health
- Department of Occupational Health- Nha Trang Pasteur Institute.
- Ho Chi Minh Hygiene and Public Health Institute
- Tay Nguyen Epidemiology Institute
- National Institute of Health Inspection
Provincial Health Bureau
In 63 provinces
Ministries/Branches Health center (Transportation, Construction, Trade and Industry, Agriculture, Railway Garment, Aviation,
Occupational Health Division- Provincial Preventive Medicine Center/ Center for worker's health protection and environment
Factory, enterprise
DISTRIC HEALTH CENTER
COMMUNE HEALTH CENTER
Cooperatives, small and medium enterprise

Figure 1. Occupational Health System in Vietnam

2.3. Working condition of industrial zones

In the past decade, global industrialization was expanded, which increases the national incomes in many countries. Along with economic growth, it is a challenge for industrialized countries to manage the working conditions. The International Labor Organization developed the guideline for occupational safety and working conditions, but the majority of the workers in the world do not meet the minimum standards by this agency. Employees have to work under an insecure condition, poor air quality, unsanitary, and poor work practice [14]. According to the report from the International Labour Organization, roughly, nearly 2.3 million deaths accounted for work-related injury worldwide and about 1.4 million fatal occupational in Asia [15]. Joseph LaDou indicated in his earlier work that the industrialization also brought the domestic hazardous industries, poor working environment in factories, lack of efficient regulation to protect workers' health. Most developing countries have inadequacy occupational health regulations and protective measures [14].

The rapid industrialization also increases the number of work-related accidents in Vietnam [16-18]. However, due to the lack of data, the exact number of national injuries annually was tough to locate. Research about work-related injuries in Xuan Tien commune in Vietnam indicated that about 80% of injuries in the commune accounted for work [16]. The

most updated information about occupational death in 2016 reported among 8,000 occupational accidents; over 860 workers were death attributed to work [19]. The Hansae report also demonstrated that industrial factories in Vietnam failed to protect workers' health and legal right [4]. Besides, workers have to exposed with endanger environment at work including lack of anti-fatigue mats for workers standing all shift, blocked exit doors and exit passageways; exit doors with lockable hasp, improper use of personal protection, unsafe stacking of heavy materials in storage areas, denial of rest periods for menstruating workers, etc.[4] Additionally, an analysis of the occupational safety and health system in Vietnam showed that industrial factories have inadequate OSH information system, lack of adequate inspection activities [20]. Moreover, the lack of updated information as well as financial resources becomes an obstacle to improve the workplace environment in Vietnam.

2.4. Factor associated with the health status and quality of life of workers

Concerning the factor associated to the physical, mental health and quality of life of workers, the working environment becomes one of the related factors which illustrated in many studies [14, 21, 22]. The definition of health by the World Health Organization is “Health is a state of complete physical, mental and social well-being and not merely the absence of disease

or infirmity" [23]. Job performance and working conditions on health well documented in many developed countries. Beside economic growth, not only the epidemiologist and psychologist but also economists are interested in the relationship between working conditions and health. The most common term used to invest the relationship involve physical working condition, working time, job satisfaction, etc. [22] Notably, a review how work and working condition affect workers' health by Thomas Barnay indicated European workers experienced high level of pressure accounted for work [22] and high prevalence of dissatisfaction with their working condition [24]. Moreover, European workers also worry about the effect of uncomfortable positions at work, annoyable noise, repetitive movement to their physical health [24]. The unwanted long working hours and intentionally stay in employment also affect the health of individual [21, 22]. The higher prevalence of chronic diseases such as low back pain, musculoskeletal disorders was observed among workers [25].

What is more, the physical health status of workers has an impact on the depression condition [22]. Chronical workers have to overcome with a psychological, mental health problem, depressive symptom, unemployment, etc. which may increase work-related problems [21, 22, 25]. A systematic review on the working environment and depressive symptom strengthen the evidence of job strain, hazardous working condition, job insecurity

influenced to the near-future development of mental health problem [26]. A similar finding also indicated in work by Margreet et al., which has shown that the low job security added the chance of depression disorders [27]. Moreover, the most recent research in Vietnam invested that the depressive among industrial workers demonstrated the high prevalence of mental disorder (somewhere in the vicinity of 38.6%) among the sample [28], and it still is one of the public health issues that need to overcome in order to enhance workers health and quality of life. Likewise, the literature assesses the quality of life of industrial workers from four ASEAN countries including Vietnam illustrate the worker's behavior, working hours, and workplace ergonomics and environment influenced their health-related quality of life [29]. Furthermore, an earlier work from Bach. X. T about the quality of life among industrial workers confirmed the lower quality of life of industrial labourers and it is due to the environmental working condition, migrant status, morbidity, the pressure at work and the burden of income [30]. To tackle these problems, we suggest to invest more deeply and widely the association between the working condition and workers' health.

2.5. Study objectives

Our main objective is to identify the impact of working environments on the occupational health status of labourers in industrial factories in Vietnam.

We have three specific objectives as below:

1. To describe the current working environments amongst industrial factories in Vietnam.
2. Assess the association between the working environment and the health status of workers in these factories.
3. Assess the association between the working environment and the quality of life of workers in these factories.

2.6. The necessity of this study

The necessary of this study is to update the current situation in terms of working environments in industrial factories in Vietnam. While working conditions is one of the most important factors which directly affects the worker's health. Moreover, we would like to assess the gap between the occupational health and safety laws in Vietnam and the implementation in real situations. Through this research, we can have important information to develop and enhance the policies and plan toward occupational health and safety in Vietnam.

3. Methodology

3.1. Study design and sample size

A cross-sectional study conducted in four cities in Vietnam in 2019. Four cities were chosen to represent for each part of Vietnam from North to

South. The eligibility criteria for selecting participants, including:

1) industrial workers older than 18 years old;

2) working under labor contracts;

3) more than 6 months of working;

4) approving to provide information to the study;

5) affording to communicate with the interviewers.

We excluded participants who were not able to answer the questionnaire due to severe conditions during the recruitment process.

We used the mixed multi-stage and convenience sampling method. Firstly, we selected four industrialized cities in Vietnam from North to South: Hanoi, Quang Ngai, Quang Nam, and Can Tho. Hanoi represents the North part of Vietnam, which has the second-highest population and is one of the biggest cities in Vietnam. The next city is Quang Ngai, which locates in the center of Vietnam and represents for the Southcentral coast. Dong Nai is the third city that represents the Southeast part, and lastly, Can Tho represents for Southwest. Each city, we selected multi factories to depend on the situation in that city. The total number respondent participated in each city was 300. Finally, a total of 1200 participants enrolled in our study.

3.2. Survey method and instruments

The survey questionnaire was conducted among participants. The data collectors were researchers who underwent well-training. Participants who meet the eligibility criteria will be invited into a small private counseling room within the factory in order to protect their confidentiality. Before joining the study, workers were introduced to the purpose of research, including benefits and drawbacks during the study. Participants would sign informed consent if they agreed to join the study. The consenting process was held in a restricted-access area, allowing participants to freely and privately decide to participate in the research.

3.3. Data management

3.3.1. Socioeconomic and career characteristics

Participants were asked to self-report their information about gender, age, highest education level, marital status, self-monthly income, number of children. Other variables also were collected regarding working years of experience, and the number of working hours per day.

3.3.2. Health-related quality of life (HRQOL)

We used the validated Vietnamese version of instrument EQ-5D-5L to measure the quality of life of each individual. This measurement included five categories of HRQOL: mobility, self-care, usual activities,

pain/discomfort, and anxiety/depression. Five levels of response were measured, including no problems, slight problems, moderate problems, severe problems, and extreme problems. We also examined the self-rated health by using the EQ-VAS (Visual Analogue Scale), which was introduced to be a 20-cm vertical scale with the endpoint ranges from 0 to 100 point, labeled "the worst health you can imagine" and "the best health you can imagine" [31]. Participants were asked to fill-up the questionnaire to self-report their current acute and chronic conditions and the number of health problems that they currently suffered.

3.3.3. Mental health measured by the patient health questionnaire (PHQ-9)

Regrading to measure the mental disorder of participants, we used the validated Vietnamese instrument PHQ-9 [32]. This tool includes 9 questions to examine the depression severity, by asking individuals how often they have been bothered by the following problems such as (1) Little interest or pleasure in doing things; (2) Feeling down, depress, or hopeless; (3) Trouble falling or staying asleep, or sleeping too much; (4) Feeling tired or having little energy; (5) Poor appetite or overacting; (6) Feeling bad about yourself or that you are a failure or have let yourself or family down; (7) Trouble concentrating on things, such as reading the newspaper or watching television; (8) Moving or speaking so slowly that other people

could have noticed. Alternatively, the opposite being so fidgety or restless that you have been moving around a lot more than usual; (9) Thoughts that you would be better off dead or of hurting yourself in some way [33]. We calculated the score of 0, 1, 2, 3 to the self-report from individuals at four levels of "not at all," "several days," "more than half the days," and "nearly every day," respectively. The score will range from 0 to 27. The condition of participants was labelled as depression severe if their score was 20-27, "moderately severe" if their score was 15-19, "moderate" when the PHQ-9 score was 10-14, "mild" when the score was 5-9 and "none-minimal" if the score was 0-4 [33].

3.3.4. Occupational health and safety

We asked participants to self-report their information about the occupational conditions in their workplace. We modified the questionnaire from the “Workplace health and safety survey” which includes four parts: workplace hazards, workplace policies and procedures, occupational health and safety awareness and participation in occupational health and safety [34]. The original survey was developed by the Institute for Work and Health into two languages English and French. This tool was created in order to identify workers who may be vulnerable to occupational health and safety risk at workplace. This questionnaire was first used in the Canada and Europe, then it was also used to assessing working environments in

developing countries [29]. Additionally, we also used the part occupational safety and health from the Vietnamese version of Better Work Compliance Assessment Tool Global Template [35]. This Compliance Assessment Tool was developed based on the combination between the International Labour standards and the Vietnam National Labour Law, structured in three levels as well as (1) Cluster, (2) Compliance and (3) Questions.

Regarding the workplace hazards, we asked the respondent to report their workplace conditions and how often did they have to expose these hazards. This part involved these following questions: manually lift, carry or push items heavier than 20kg at least 10 times during the day, Do repetitive movements with your hands or wrists (packing, sorting, assembling, cleaning, pulling, pushing, typing) for at least 3 hours during the day; performing work tasks, or using work method which is not familiar; working under the environment which is too hot or too cold; working at the risk of falling, flipping; workplace was too noisy…[34, 36] Participators were label as exposed to hazards if they experience more than two of the fifteen hazards more often than weekly, or those who exposed to just one of the below hazards more often than weekly: lifting, carry or push items heavier than 20kg, work at heights greater than 2m, experiences with hazardous material (chemicals, gases, flammable liquids) [36, 37]. In order to measure the physical working condition, we modified the questionnaire

from the Workplace health and safety survey [34], and the previous study on the Workplace exposure on Quality of life in workers in four ASEAN countries [29]. After combining from two references, we added six questions in this part such as (1) night shift work, (2) exposed to various type of smoke (coal smoke, welding smoke,…); (3) contact with components such as rubber, plastic product, etc.

To examine the adequacy to policies, procedures, awareness and the participation of workers in the safety at workplace, we asked them to informed the regulation in the factory, their awareness and empowerment in total 27 questions with five levels of agreement (strongly disagree, disagree, normal, agree, strongly agree) [34, 36, 37].

To define workers as inadequate access to policies and procedures, lack of awareness if they choose strongly disagree or disagree with more than one statement in the policies and procedure, awareness about right and responsibility about safety at the workplace [34, 36]. The overall vulnerability workers were considered if they had exposed to hazards in the factories and inadequacy in one of the three domains above [37, 38].

3.4 Statistical analysis

We used frequencies and proportions to describe the qualitative variables. We reported the quantitative variables with normal distribution by mean and standards deviations. Additionally, the Mann-Whitney test and Kruskal Wallis test to investigate the EQ5D index's mean differences between two or more groups. A statistically significant was indicated if a p-value is less than 0.05. Logistic regression was used to examine factors associated with health status; also the odds ratios and 95% CI (confident intervals) were calculated as well. Stepwise with p-values <= 0.2 for the Wald test was used to include variables in the model. The Tobit regression was made use of to evaluate the association between the individual characteristic and health-related quality of life of labourers. The STATA software (Stata Corp. L.P., College Station, TX) was employed to perform all statistical analyses.

3.5 Ethical consideration

The study received ethical approval by the Institutional Review Board of Youth Research Institute, Vietnam (Decision No 01a QD/ VNCTN; code KX VTN 19-01). After receiving the decision, data were collected from January 2019 until June of this year. We provided the informed consents to all participants and explained the full objective of our questionnaire, the confidentiality principle of the measurement, the

procedure, the further benefits for industrial workers and the public. Respondents only enrolled in our research after they fully understand, agree, and sign the inform consent. All workers could refuse or stop answering the questionnaire at any time without any discrimination, and not affect their relationship with both interviewers of their manager.

4. Results

Table 1. Demographic characteristic of respondents

Characteristic	Gender					
	Male		Female		Total	
	n	%	n	%	N	%
City						
Hanoi	152	22.7	148	27.9	300	25.0
Quang Ngai	170	25.4	130	24.5	300	25.0
Dong Nai	183	27.3	117	22.1	300	25.0
Can Tho	165	24.6	135	25.5	300	25.0
Age						
<= 25 years old	158	23.6	151	28.5	309	25.8
26 - 30 years old	239	35.7	224	42.3	463	38.6
>30 years old	273	40.8	155	29.3	428	35.7
Immigration status						
Local People	506	75.5	398	75.1	904	75.3
Immigrant from other cities	164	24.5	132	24.9	296	24.7
Education						
High school or under	119	17.8	98	18.5	217	18.1
College or higher	551	82.2	432	81.5	983	81.9
Marital status						
Single	295	44.0	235	44.3	530	44.2
Have spouse/partner	375	56.0	295	55.7	670	55.8
Number of children						
0	336	50.2	275	51.9	611	50.9
1 or more	334	49.9	255	48.1	589	49.1
Self-monthly income (Vietnamese thousands dong)*						
Lowest (1.000-4.000)	234	41.2	145	32.7	379	37.5
Low (4.200-5.000)	173	30.5	121	27.3	294	29.1
Medium (5.100-6.000)	98	17.3	86	19.4	184	18.2
High (6.200-20.000)	63	11.1	92	20.7	155	15.3
Type of factory						
Clothing and textiles/ Leather shoes	340	50.8	242	45.7	582	48.5
Mechanical/ Metallurgy	98	14.6	83	15.7	181	15.1

Characteristic	Gender					
	Male		Female		Total	
	n	%	n	%	N	%
Electronics, Computers and Transportation	112	16.7	88	16.6	200	16.7
Food production	85	12.7	61	11.5	146	12.2
Others	35	5.2	56	10.6	91	7.5
Years of working						
<= 10 years	627	93.6	510	96.2	1,137	94.8
> 10 years	43	6.4	20	3.8	63	5.3
EQ5D5L**						
Having problems in mobility	321	47.9	239	45.1	560	46.7
Having problems in self-care	283	42.2	216	40.8	499	41.6
Having problems with usual activity	304	45.4	220	41.5	524	43.7
Pain/Discomfort	448	66.9	290	54.7	738	61.5
Anxiety/Depression	453	67.6	321	60.6	774	64.5
Depression***						
None-minimal	321	47.9	252	47.6	573	47.7
Mild	138	20.6	123	23.2	261	21.8
Moderate	165	24.6	122	23.0	287	23.9
Moderately severe	45	6.7	32	6.0	77	6.4
Severe	1	0.2	1	0.2	2	0.2
Having health symptom						
0	328	49.0	233	44.0	561	46.8
1 ore more	342	51.0	297	56.0	639	53.3
Having health problems						
0	309	46.1	225	42.5	534	44.5
1 ore more	361	53.9	57.55	57.6	6660	55.5
Feeling exhausted						
No	397	59.2	318	60.0	715	59.6
Yes	273	40.8	212	40	485	40.4
Workplace hazards exposure****						
No	110	16.4	64	12.1	174	14.5
Yes	560	83.6	466	87.9	1,026	85.5
Policies and procedure at workplace****						
Inadequate	17	2.5	18	3.4	35	2.9

Characteristic	Gender					
	Male		Female		Total	
	n	%	n	%	N	%
Adequate	653	97.5	512	69.6	1,165	97.1
Awareness about OHS**						
Inadequate	63	9.4	52	9.8	115	9.6
Adequate	607	90.6	478	90.2	1,085	90.4
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**
EQ-5D index	0.77	0.19	0.79	0.20	0.78	0.19
EQ-VAS (score)	67.0	26.8	65.3	26.4	66.3	26.6
Number of health problem	6.27	3.55	6.23	3.20	6.25	3.39

* Self-monthly income: We calculated the mean monthly income of each group

** Quality of life was measured by using the EuroQol- 5 Dimensions- 5 Levels Vietnamese version and visual analog scale VAS score

***Depression was measured by using the Patient Health Questionnaire

****Occupational health and safety was measured by the Workplace health and safety survey

Table 1 demonstrates the general demographic characteristics of the respondent. The total of participants were 1,200, among them about three quarters were local people and most of them had an education level above high school. More than 55% of participants had a spouse or partner; however, only 2% had more than two children. The majority of workers worked at clothing and textiles/ Leather shoe factory with the length of working for less than 10 years. The income level of respondent was quite low (about 50% of participants reported at lowest and low-income level). Nearly 90% of respondents had exposed to hazards at the workplace; as a result, more than half of them had at least one or more health problems, health symptoms or problems with morbidity and mental health.

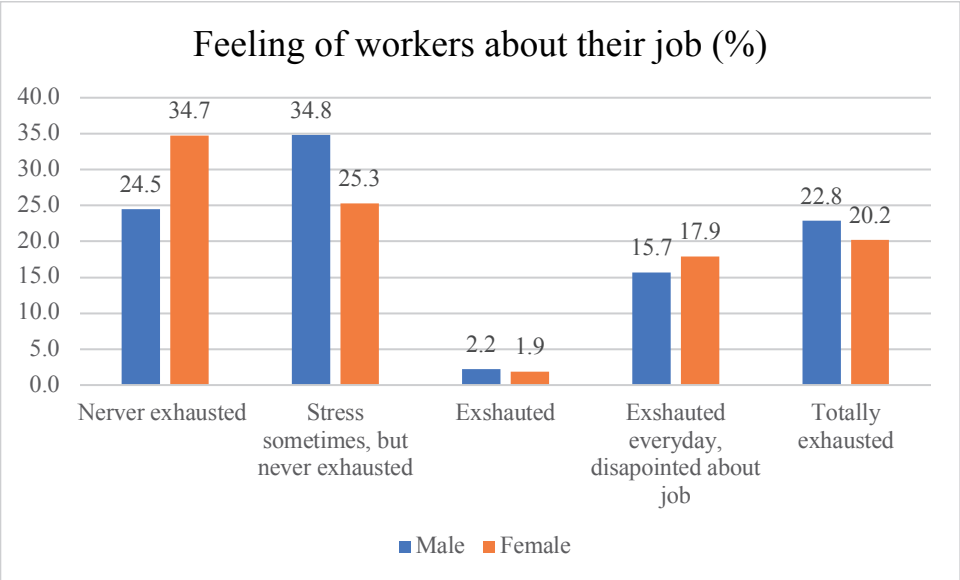

Figure 2. Feeling of workers about their job

Figure 2 indicates the feeling of respondents about their job. About half of the participant's answered that they feel exhausted, both physical and mental and totally exhausted every day about their job. Male workers were more likely to feel exhausted than female workers

Table 2. Chemicals and hazardous materials storage

Chemicals and hazardous materials	Strongly disagree		Disagree		Normal		Agree		Strongly agree	
	n	%	n	%	n	%	n	%	n	%
Chemicals and hazardous substances properly labeled	9	0.8	7	0.6	100	8.3	833	69.4	251	20.9
You can read and understand the label on chemicals and hazardous substances	8	0.7	5	0.4	143	11.9	761	63.4	283	23.6
Chemicals and hazardous substances properly stored	6	0.5	3	0.3	96	8.0	814	67.8	281	23.4
There is a safety construction to follow when working with chemicals and hazardous materials	4	0.3	5	0.4	79	6.6	859	71.6	253	21.1
The process of assessing, monitoring and limiting workers' exposure to chemicals and to xic substances is built and implemented	12	1.0	9	0.8	235	19.6	697	58.1	247	20.6
Workers are instructed about regulations when work with chemicals and hazardous substances	11	0.9	12	1.0	150	12.5	826	68.8	201	16.8
The company provide adequate washing facilities and cleansing materials in the event of exposure to hazardous chemicals	11	0.9	6	0.5	247	20.6	725	60.4	211	17.6

*Occupational health and safety was measured by the Workplace health and safety survey

Table 2 shows the current status of chemicals and hazardous materials storage at the workplace in 4 cities. Overall, these factories have adequate regulations and policies in terms of packing chemicals and hazardous materials. Most of the workers reported that their factory labeled on hazardous substances, washing facilitates and cleansing materials in case of exposure to hazardous chemicals. Also, they could read or understand the information on chemicals and hazardous substances.

Figure 3 demonstrates the proportion of the worker who has exposed to hazards at workplaces. Among 1200 participants, workers who had exposed to hazards accounted for more than 85% of particupants. Among them, 54.6% was males.

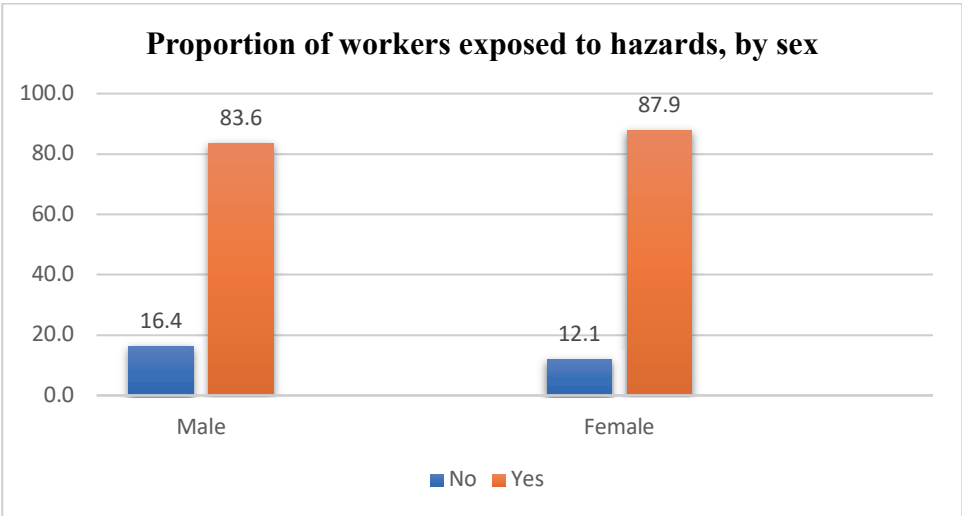

Figure 3. The proportion of workers exposed to hazards by sex

Table 3 indicates the characteristics of respondents who had exposed to hazards at workplaces. Hazard exposure was statistically more prevalent in males (54.65%) compare to females (45.4%) and in the lowest income group (39.5%) than other income groups. Workers at clothing and textiles or leather shoes and those who worked at Hanoi reported the highest prevalence of hazard exposure compared with other groups. We also observed the significant association between hazards exposure and the number of children of participants and the number of health problems.

Table 3. Distribution of hazards exposure at the workplace

Variables	Exposure to hazards						p-value
	No (n=174)		Yes (1,026)		Total (1200)		
	n	%	n	%	N	%	
Gender							
Male	110	16.42	560	83.58	670	100	**0.034**
Female	64	12.08	466	87.92	530	100	
City							
Hanoi	7	2.3	293	97.7	300	100.0	**<0.001**
Quang Ngai	56	48.7	244	81.3	300	100.0	
Dong Nai	46	15.3	254	84.7	300	100.0	
Can Tho	65	21.7	235	78.3	300	100.0	
Age							
<= 25 years old	60	19.4	249	80.6	309	100.0	**0.01**
26 – 30 years old	54	11.7	409	88.3	463	100.0	
> 30 years old	60	14.0	368	86.0	428	100.0	
Immigration status							
Local People	36	12.2	260	87.8		100.0	0.188
Immigrant from other cities	138	15.3	766	84.7		100.0	
Education							
High school or under	27	12.4	190	87.6	217	100.0	0.342
College or higher	147	15.0	836	85.1	983	100.0	
Marital status							
Single	81	15.3	449	84.7	530	100.0	0.49
Have spouse/partner	93	13.9	577	86.1	670	100.0	
Number of children							
0	82	13.4	529	86.6	611	100.0	**0.005**
1 or more	92	15.6	497	84.4	589	100.0	
Self-monthly income (Vietnamese thousands dong)*							
Lowest (1.000-4.000)	36	9.5	343	90.5	379	100.0	**<0.001**
Low (4.200-5.000)	61	20.8	233	79.3	294	100.0	
Medium (5.100-6.000)	35	19.0	149	81.0	184	100.0	
High (6.200-20.000)	11	7.1	144	92.9	155	100.0	

Variables	Exposure to hazards						p-value
	No (n=174)		Yes (1,026)		Total (1200)		
	n	%	n	%	N	%	
Type of factory							
Clothing and textiles/ Leather shoes	99	17.1	483	83.0	582	100.0	**<0.001**
Mechanical/ Metallurgy	32	17.7	149	82.3	181	100.0	
Electronics, Computers and Transportation	26	13.0	174	87.0	200	100.0	
Food production	14	9.6	132	90.4	146	100.0	
Others	3	3.3	88	96.7	91	100.0	
Feeling exhausted							
No	60	8.4	655	91.6	715	100.0	0.06
Yes	27	5.6	458	94.4	485	100.0	
Years of working							
<= 10 years	168	14.8	969	85.2	1,137	100.0	0.25
> 10 years	6	9.5	57	90.5	63	100.0	
Health problem							
0	92	17.2	442	82.8	534	100.0	**0.016**
1 or more	82	12.3	584	87.7	666	100.0	
Health symptoms							
0	90	16.0	471	84.0	561	100.0	0.155
1 or more	84	13.2	555	56.9	639	100.0	

* Self-monthly income: We calculated the mean monthly income of each group

** Quality of life was measured by using the EuroQol- 5 Dimensions- 5 Levels Vietnamese version and visual analog scale VAS score

***Depression was measured by using the Patient Health Questionnaire

****Occupational health and safety was measured by the Workplace health and safety survey

Table 4. Health status of workers who exposure to hazards

Variables	Gender						p-value
	Male (n=615)		Female (498)		Total (1,113)		
	n	%	n	%	N	%	
EQ5D5L							
Having problems in mobility	305	49.6	227	45.6	532	47.8	0.18
Having problems in self-care	263	42.8	204	40.1	467	42.0	0.54
Having problems with usual activity	285	46.3	209	42.0	494	44.4	0.14
Pain/Discomfort	416	67.6	274	55.0	690	62.0	**<0.001**
Anxiety/Depression	424	69.0	307	61.7	731	65.7	**0.001**
Depression							
None-minimal	292	47.5	239	48.0	531	47.7	0.74
Mild	118	19.2	109	21.9	227	20.4	
Moderate	160	26.0	117	23.5	277	24.9	
Moderately severe	44	7.1	32	6.4	76	6.8	
Severe	1	0.2	1	0.2	2	0.2	
Having health symptom							
0	301	48.9	220	44.2	521	46.8	0.11
1 or more	314	51.1	278	55.8	592	53.2	
Having health problems							
0	280	45.5	210	42.2	490	44.0	0.26
1 or more	335	54.5	288	57.8	623	56.0	

* Quality of life was measured by using the EuroQol- 5 Dimensions- 5 Levels Vietnamese version and visual analog scale VAS score

**Depression was measured by using the Patient Health Questionnaire

Table 4 illustrates the current health status of workers who had to expose to threats at work. The proportion of male workers had a problem in "Pain/ Discomfort" and "Anxiety/ Depression" significantly higher than a female workers. Among 1,052 participants who exposed to danger at the factory, there were 52.9% of workers had a mental health problem. Among them, 58.3% were males and the majority of the sample had moderate and mild depression.

Table 5. Policies and procedure at the workplace

Workplace policies and procedures	Strongly disagree		Disagree		Normal		Agree		Strongly agree	
	n	%	n	%	n	%	n	%	n	%
In my organization safety is as important as the quality of the work and getting the work done on time	6	0.5	2	0.2	126	10.5	867	72.3	199	16.6
Those in charge of safety have the authority to make the changes they think are necessary	2	0.2	6	0.5	175	14.6	737	61.4	280	23.3
Workers and manager work together to ensure the safest possible conditions	2	0.2	1	0.1	146	12.2	783	65.3	268	22.3
The safety of workers is a high priority for my organization	6	0.5	5	0.4	180	15.0	744	62.0	265	22.1
My organization acts quickly when a safety concern or problem is raised	5	0.4	3	0.3	183	15.3	845	70.4	164	13.7
My organization listens carefully to workers' ideas about improving safety	10	0.8	0	0.0	96	8.0	903	75.3	191	15.9
Formal safety inspections are regularly conducted in my workplace	5	0.4	5	0.4	151	12.6	845	70.4	194	16.2
Workers who act safely receive positive feedback	4	0.3	6	0.5	187	15.6	838	69.8	165	13.8
Employees are told when they do not follow good safety practices	5	0.4	8	0.7	169	14.1	864	72.0	154	12.8

Workplace policies and procedures	Strongly disagree		Disagree		Normal		Agree		Strongly agree	
	n	%	n	%	n	%	n	%	n	%
Normal inspections are regularly done to see if workers are following safety rules	4	0.3	8	0.7	182	15.2	931	77.6	75	6.3
At my workplace, everyone has the information they need to work safely	4	0.3	12	1.0	116	9.7	992	82.7	76	6.3
Workers can understand all the information about working safety	4	0.3	14	1.2	119	9.9	989	82.4	74	6.2
New employees at my organization learn quickly that they are expected to follow safety practices	6	0.5	6	0.5	238	19.8	915	76.3	35	2.9
My organization invests a lot of time in safety training for workers	1	0.1	5	0.4	159	13.3	976	81.3	59	4.9
My workplace ensures I understand what my responsibilities are for safety	3	0.3	71	5.9	97	8.1	910	75.8	119	9.9

*Occupational health and safety was measured by the Workplace health and safety survey

Table 5 displays the agreement of workers about occupational health and safety policies and procedures in their factories. Overall, most of the workers reported that these factories had efficient regulations about the safe working condition in the factory. There was a small number of workers did not agree with the current policies and procedures at their company.

Table 6. Distribution of adequacy of policies and procedure at the workplace

Variables	Policies and procedure at the workplace						p-value
	Inadequate		Adequate		Total (1200)		
	n	%	n	%	N	%	
Gender							
Male	17	2.5	653	97.5	670	100.0	0.38
Female	18	3.4	512	96.6	530	100.0	
City							
Hanoi	4	1.3	296	98.7	300	100.0	**<0.001**
Quang Ngai	4	1.3	296	98.7	300	100.0	
Dong Nai	0	0.0	300	100.0	300	100.0	
Can Tho	27	9.0	273	91.0	300	100.0	
Age							
<= 25 years old	14	4.5	295	95.5	309	100.0	**0.02**
26 - 30 years old	16	3.5	447	96.5	463	100.0	
> 30 years old	5	1.2	423	98.8	428	100.0	
Immigration status							
Local People	31	3.4	873	96.6	904	100.0	0.07
Immigrant from other cities	4	1.4	292	98.7	296	100.0	
Education							
High school or under	12	5.5	205	94.5	217	100.0	**0.01**
College or higher	23	2.3	960	97.7	983	100.0	
Marital status							
Single	16	3.0	514	97.0	530	100.0	0.85
Have spouse/partner	19	2.8	651	97.2	670	100.0	
Number of children							
0	19	3.1	592	96.9	611	100.0	0.69
1 or more	16	2.7	573	97.3	589	100.0	
Self-monthly income (Vietnamese thousands dong)*							
Lowest (1.000-4.000)	5	1.3	374	96.7	379	100.0	**<0.001**
Low (4.200-5.000)	21	7.1	274	92.9	294	100.0	
Medium (5.100-6.000)	3	1.6	181	98.4	184	100.0	

Variables	Policies and procedure at the workplace						p-value
	Inadequate		Adequate		Total (1200)		
	n	%	n	%	N	%	
High (6.200-20.000)	5	3.2	150	96.8	155	100.0	
Type of factory							
Clothing and textiles/ Leather shoes	28	4.8	554	95.2	582	100.0	**0.01**
Mechanical/ Metallurgy	1	0.6	180	99.5	181	100.0	
Electronics, Computers and Transportation	2	1.0	198	99.0	200	100.0	
Food production	3	2.1	143	98.0	146	100.0	
Others	1	1.1	90	98.9	91	100.0	
Feeling exhausted							
No	29	4.1	686	95.9	715	100.0	**0.004**
Yes	6	1.2	479	98.8	485	100.0	
Years of working							
<= 10 years	33	2.9	1,104	97.1	1,137	100.0	0.90
> 10 years	2	3.2	61	96.8	63	100.0	
Health problem							
0	14	2.6	520	97.4	534	100.0	0.58
1 or more	21	3.2	645	96.9	666	100.0	
Health symptoms							
0	13	2.3	548	97.7	561	100.0	0.25
1 or more	22	3.4	617	96.6	639	100.0	

* Self-monthly income: We calculated the mean monthly income of each group

** Quality of life was measured by using the EuroQol- 5 Dimensions- 5 Levels Vietnamese version and visual analog scale VAS score

***Depression was measured by using the Patient Health Questionnaire

****Occupational health and safety was measured by the Workplace health and safety survey

The socio-characteristics of respondents for the accessibility of policies and procedures about occupational health in factories are demonstrated in table 6. The industrial zone located in Can Tho and clothing and textiles or leather shoe factories were more likely to had inadequate policies and procedures (9% and 4.8% respectively) in terms of occupational health. Younger workers and in the lower-income group were probable to have inadequate access to policies and procedures about safety at workplaces. Workers had high school or under education level reported a statistically higher prevalence of inadequate policies and procedures (5.5%) than the other workers (2.2%).

Table 7 shows the agreement of workers about their awareness about right and responsibility at the workplace. Overall, the majority of respondents had acceptable awareness about workplace safety and health. However, there was 10% of respondents reported that they did not know how to perform their job in a safe manner and about 6% of the sample did not clear about their rights and responsibilities concerning workplace health and safety.

Table 7. Occupational health and safety awareness

Occupational health and safety awareness	Strongly disagree		Disagree		Normal		Agree		Strongly agree	
	n	%	n	%	n	%	n	%	n	%
I am clear about my rights and responsibilities in relation to workplace health and safety	6	0.5	63	5.3	119	9.9	969	80.8	43	3.6
I am clear about my employers 'rights and responsibilities in relation to workplace health and safety	4	0.3	2	0.2	179	14.9	845	70.4	170	14.2
I know how to perform my job in a safe manner	6	0.5	115	9.6	109	9.1	813	67.8	157	13.4
I have the knowledge to assist in responding to any health and safety concerns at my workplace	6	0.5	58	4.8	277	23.1	731	60.9	128	10.7
I know what the necessary precautions are that I should take while doing my job	1	0.1	53	4.4	118	9.8	996	83.0	32	2.7

*Occupational health and safety awareness was measured by the Workplace health and safety survey

Table 8. Distribution of adequacy awareness about occupational health and safety

Variables	Awareness about occupational health and safety						p-value
	Inadequate		Adequate		Total (1200)		
	n	%	n	%	N	%	
Overall	115	9.6	1,085	90.4			
Gender							
Male	63	9.4	607	90.6	670	100.0	0.81
Female	53	9.8	478	90.2	530	100.0	
City							
Hanoi	51	17.0	249	83.0	300	100.0	**<0.001**
Quang Ngai	20	6.7	280	93.3	300	100.0	
Dong Nai	32	10.7	268	89.3	300	100.0	
Can Tho	12	4.0	288	96.0	300	100.0	
Age							
<= 25 years old	23	7.4	286	92.6	309	100.0	0.16
26 - 30 years old	53	11.5	410	88.6	463	100.0	
> 30 years old	39	9.1	389	90.9	428	100.0	
Immigration status							
Local People	83	9.2	821	90.8	904	100.0	0.40
Immigrant from other cities	32	10.8	264	89.2	296	100.0	
Education							
High school or under	12	5.5	205	94.5	217	100.0	**0.025**
College or higher	103	10.5	880	89.5	983	100.0	
Marital status							
Single	56	10.6	474	89.4	530	100.0	0.30
Have spouse/partner	59	8.8	611	91.2	670	100.0	
Number of children							
0	69	11.3	542	88.7	611	100.0	**0.04**
1 or more	46	7.8	543	92.2	589	100.0	
Self-monthly income (Vietnamese thousands dong)*							
Lowest (1.000-4.000)	44	11.6	335	88.4	379	100.0	**<0.001**
Low (4.200-5.000)	12	4.1	282	95.9	294	100.0	
Medium (5.100-6.000)	13	7.1	171	92.9	184	100.0	
High (6.200-20.000)	24	15.5	131	84.5	155	100.0	
Type of factory							
Clothing and textiles/ Leather shoes	44	7.6	538	92.4	582	100.0	**<0.001**
Mechanical/ Metallurgy	22	12.2	159	87.9	181	100.0	
Electronics, Computers and Transportation	19	9.5	181	90.5	200	100.0	
Food production	11	7.5	135	92.5	146	100.0	
Others	19	20.9	72	79.1	91	100.0	

Variables	Awareness about occupational health and safety						p-value
	Inadequate		Adequate		Total (1200)		
	n	%	n	%	N	%	
Feeling exhausted							
No	29	4.1	686	95.4	715	100.0	**<0.001**
Yes	86	17.7	399	82.3	485	100.00	
Years of working							
<= 10 years	111	9.8	1,026	90.2	1,137	100.0	0.37
> 10 years	4	6.4	59	93.7	63	100.0	
Health problem							
0	54	10.1	480	89.9	534	100.0	0.58
1 or more	61	9.2	605	90.8	666	100.0	
Health symptoms							
0	59	10.5	502	89.5	561	100.0	0.30
1 or more	56	8.8	583	91.2	639	100.0	

* Self-monthly income: We calculated the mean monthly income of each group

** Quality of life was measured by using the EuroQol- 5 Dimensions- 5 Levels Vietnamese version and visual analog scale VAS score

***Depression was measured by using the Patient Health Questionnaire

****Occupational health and safety was measured by the Workplace health and safety survey

The characteristic of workers had inadequate awareness of workplace health, and safety is demonstrated in table 8. Overall, 9.6% of the total had experienced inadequate awareness of workplace rights and responsibilities. Among them, workers in Hanoi (44.4%), had lowest self-monthly income (47.3%) and worked at clothing and textiles or leather shoes (38.3%) reported a statistically higher proportion of inadequate awareness than workers in other cities, higher-income group or other factories.

Table 9. EQ-5D index and EQ-VAS according to demographic characteristic of respondents

Variables	EQ-5D index**			EQ-VAS**		
	Mean	SD	p-value	Mean	SD	p-value
Overall	0.78	0.20		66.3	26.6	
Gender						
Male	0.77	0.19	0.07[a]	67.0	26.8	0.16[a]
Female	0.79	0.20		65.3	26.4	
City						
Hanoi	0.80	0.13	**<0.001**[b]	77.5	24.1	**<0.001**[b]
Quang Ngai	0.79	0.16		66.6	25.9	
Dong Nai	0.68	0.23		45.9	15.3	
Can Tho	0.85	0.20		75.1	26.9	
Age						
<= 25 years old	0.81	0.20	**<0.001**[b]	68.6	27.6	0.09[b]
26 - 30 years old	0.76	0.21		64.4	26.8	
> 30 years old	0.78	0.18		66.6	26.6	
Immigration status						
Local People	0.79	0.19	**<0.001**[a]	67.2	26.5	**0.03**[a]
Immigrant from other city	0.74	0.20		63.5	26.7	
Education						
High school or under	0.77	0.19	0.53[a]	66.0	28.4	0.70[a]
College or higher	0.78	0.19		66.3	26.2	
Marital status						
Single	0.80	0.19	**0.02**[a]	70.3	25.9	**<0.001**[a]
Have spouse/partner	0.77	0.20		63.1	26.6	
Number of children						
0	0.79	0.20	**0.04**[a]	67.8	26.3	0.07[a]
1 or more	0.78	0.18		64.6	26.8	
Self-monthly income (Vietnamese thousands dong)*						
Lowest (1.000-4.000)	0.79	0.19	**<0.001**[b]	68.2	24.6	**<0.001**[b]

Variables	EQ-5D index**			EQ-VAS**		
	Mean	SD	p-value	Mean	SD	p-value
Low (4.200-5.000)	0.78	0.19		69.9	30.2	
Medium (5.100-6.000)	0.80	0.20		63.2	27.4	
High (6.200-20.000)	0.85	0.14		77.9	21.2	
Type of factory						
Clothing and textiles/ Leather shoes	0.83	0.17	**<0.001** [b]	75.4	26.0	**<0.001** [b]
Mechanical/ Metallurgy	0.73	0.22		53.2	20.7	
Electronics, Computers and Transportation	0.71	0.23		49.4	21.7	
Food production	0.77	0.18		65.7	25.2	
Others	0.79	0.17		71.4	24.5	
Feeling exhausted						
No	0.82	0.18	**<0.001** [a]	75.3	24.3	**<0.001** [a]
Yes	0.71	0.20		52.9	24.1	
Years of working						
<= 10 years	0.78	0.20	**0.004** [a]	65.57	26.7	**<0.001** [a]
> 10 years	0.85	0.12		78.9	22.4	
Health problem						
0	0.81	0.20	**<0.001** [a]	67.3	27.6	0.20 [a]
1 or more	0.75	0.18		65.5	25.8	
Health symptoms						
0	0.80	10.5	**<0.001** [a]	64.7	27.7	0.06 [a]
1 or more	0.76	8.8		67.6	25.6	

* Self-monthly income: We calculated the mean monthly income of each group

** Quality of life was measured by using the EuroQol- 5 Dimensions- 5 Levels Vietnamese version and visual analog scale VAS score

*** Depression was measured by using the Patient Health Questionnaire

**** Occupational health and safety was measured by the Workplace health and safety survey

[a] p-value from Mann-Whitney test

[b] p-value from Kruskal Wallis test

Table 9 displays the relationship between a socio-demographic characteristic and the health-related quality of life among industrial workers. We found the relationship between both EQ-5D index score and EQ-VAS score and several variables such as: immigration status ($p<0.001$, $p=0.03$; respectively), place locate factory ($p<0.001$), marital status ($p=0.02$, $p<0.001$; respectively), self-monthly income, type of factory, years of working and feeling about the job in the factory. Interestingly, there were no differences in quality of life between two groups of education level.

Table 10 shows the proportion of inadequate policies and procedures, awareness, and overall vulnerabilities by hazards exposure. As the definition of occupational health and safety vulnerability, workers were considered as vulnerable if they had exposed to hazards and had inadequate access to at least one of the two kinds of mitigation resources (policies and procedures, and awareness). By categories of vulnerable occupational health and safety, the prevalent of vulnerable awareness was highest accounted for 10.9%, followed by policies and procedures vulnerability (2.5%).

Table 10. Distribution of inadequate policies and procedure, inadequate awareness, and inadequate empowerment by hazard exposure

Variables	Expose to hazards					
	Unexposed (174)		Exposed (1,026)		Total (1200)	
	n	%	n	%	N	%
Overall						
Inadequate	0	0.0	8	0.8	8	0.7
Adequate	174	100.0	1,026	99.2	1,192	99.3
Policies and procedures						
Inadequate	9	5.2	26	2.5	35	2.9
Adequate	165	94.8	1,000	97.5	1,165	97.1
Awareness						
Inadequate	3	1.7	112	10.9	115	9.6
Adequate	171	98.3	914	89.8	1,085	90.4

*Occupational health and safety was measured by the Workplace health and safety survey

Table 11. Univariate logistic regression for health problem (Adjust by age, gender, and marital status)

	Overall		Unexposed		Exposed	
	aOR	**95% CI**	**aOR**	**95% CI**	**aOR**	**95% CI**
Exposed to hazards (Unexposed=ref)	**1.43**	**1.03-1.98**				
City (Hanoi=ref)						
Quang Ngai	**1.46**	**1.03-2.07**	2.18	0.42-11.27	**1.53**	**1.05-2.23**
Dong Nai	**0.73**	**0.52-1.02**	0.62	0.11-3.31	**0.78**	**0.54-1.11**
Can Tho	**0.23**	**0.16-0.33**	0.34	0.05-2.00	**0.21**	**0.14-0.31**
Immigration status (Local People=ref)	0.83	0.64-1.09	0.79	0.37-1.67	**0.87**	**0.65-1.15**
Education (High school or under = ref)	0.79	0.58-1.07	0.46	0.19-1.07	**0.88**	**0.63-1.21**
Number of children (0=ref)	**0.73**	**0.51-1.05**	0.98	0.37-2.57	**0.73**	**0.49-1.08**
Self-monthly income (Lowest=ref)						
Low	**0.77**	**0.56-1.05**	0.55	0.22-1.33	**0.80**	**0.57-1.13**
Medium	**0.62**	**0.43-0.89**	0.52	0.19-1.36	**0.61**	**0.41-0.91**
High	**0.77**	**0.52-1.13**	0.34	0.08-1.39	**0.81**	**0.54-1.21**
Type of factory (Clothing and textiles/ Leather shoes=ref)						
Mechanical/ Metallurgy	**1.09**	**0.77-1.55**	1.16	0.51-2.66	**1.10**	**0.76-1.60**
Electronics, Computers and Transportation	**2.10**	**1.49-2.97**	1.11	0.45-2.71	**2.36**	**1.61-3.47**
Food production	**1.26**	**0.87-1.82**	2.57	0.74-8.87	**1.18**	**0.80-1.75**
Others	**1.85**	**1.16-2.96**	0.53	0.04-6.20	**1.86**	**1.14-3.01**
Feeling exhausted (No=ref)	1.21	0.95-1.53	0.73	0.29-1.85	1.25	0.97-1.59

	Overall		Unexposed		Exposed	
	aOR	**95% CI**	**aOR**	**95% CI**	**aOR**	**95% CI**
Years of working (<=10 years=ref)	0.74	0.43-1.24	1.19	0.22-6.38	0.68	0.39-1.18
Health symptoms (0=ref)	**2.45**	**1.94-3.10**	**2.99**	**1.60-5.58**	**2.35**	**1.82-3.02**
EQ5D5L (No=ref)						
Having problems in mobility	**1.75**	**1.39-2.21**	0.76	0.41-1.40	**2.05**	**1.59-2.66**
Having problems in self-care	**1.93**	**1.52-2.45**	1.05	0.55-2.02	**2.10**	**1.62-2.72**
Having problems with usual activity	**2.11**	**1.67-2.68**	1.06	0.55-2.04	**2.32**	**1.79-3.01**
Pain/Discomfort	**2.24**	**1.76-2.86**	1.87	0.95-3.65	**2.36**	**1.82-3.07**
Anxiety/Depression	**2.66**	**2.08-3.40**	1.64	0.85-3.01	**2.90**	**2.22-3.81**
Depression (None-minimal=ref)						
Mild	**1.76**	**1.30-2.38**	1.74	0.83-3.62	**1.96**	**1.39-2.77**
Moderate	**1.47**	**1.10-1.97**	1.93	0.87-4.27	**1.45**	**1.06-1.99**
Moderately severe	**1.46**	**0.89-2.38**	5.03	0.92-27.24	**1.24**	**0.74-2.08**
Severe	**.**		.		**1.00**	**.**
Policies and procedure (Inadequate=ref)	**0.78**	**0.39-1.56**	1.16	0.29-4.53	**0.65**	**0.28-1.48**
Awareness (Inadequate=ref)	**1.11**	**0.75-1.64**	1.67	0.14-19.18	**1.14**	**0.77-1.70**

* Self-monthly income: We calculated the mean monthly income of each group: Lowest (1.000-4.000) Low (4.200-5.000) Medium (5.100-6.000) High (6.200-20.000)

** Quality of life was measured by using the EuroQol- 5 Dimensions- 5 Levels Vietnamese version and visual analog scale VAS score

***Depression was measured by using the Patient Health Questionnaire

****Occupational health and safety was measured by the Workplace health and safety survey

Table 11 displays the association between the demographic characteristic and health problem of workers in two subgroups: "exposed" and "unexposed" to hazards at work. Overall, having health problems significantly associated with hazards exposure (Exposed to hazards: OR=1.43, 95% CI= 1.03-1.98), place of the factory (Quang Ngai: OR=1.46, 95% CI= 1.03-2.07). In contrast, participants who worked at Can Tho were less likely to have health problems than other cities (OR=0.23, 95% CI=0.16-0.33). Respondents worked at "Electronics, Computers and Transportation" factories, had depression, had "1 or more" health symptoms were significantly reported a higher number of health-problem than others.

Among the unexposed group, the odds of having health problem among those who had health symptoms was 2.99 times higher (95% CI= 1.60-5.58) for those who have no health symptom. Regarding the exposed group, participants who worked in Quang Ngai, worked at "Electronics, Computers and Transportation" factories showed a statistically dangerous effect. Those who had "1 or more" health symptoms experienced 2.35 times higher odd compared to those who had no health symptoms. Compared to participants who had "non-minimal" depression, odd of having health problems were 1.96 times higher (95% CI= 1.39-2.77) for those who had "mild" depression, and 1.45 times higher (95%CI=1.06-1.99) for those having "moderate" depression,

respectively. In contrast, worker in "medium" self-income group or worked in Can Tho city experienced significantly lower odds (OR= 0.61, 95% CI=0.41-0.91; OR=0.21, 95% CI=0.14-0.31, respectively) than others.

The association between outcome “having health symptoms” and the demographic characteristics of samples is indicated in table 12. Overall, compared to “non-minimal” depression, individuals had “mild’ depression, and “moderate” depression showed significant higher odds of having health symptom (OR= 1.75, 95% CI=1.29-2.36; OR= 1.55, 95% CI= 1.16-2.07, respectively). Compared to workers who had no problem, those who had difficulty in "mobility," "self-care," "usual activity," "pain-discomfort," and "anxiety/ depression" presented the higher odds of having health symptoms. (OR=1.47, 95% CI=1.17-1.86; OR=1.67, 95% CI=1.32-2.11; OR=1.79, 95% CI=1.42-2.27; OR=1.95, 95% CI=1.54-2.49; and OR=1.79, 95% CI=1.40-2.28, respectively).

Table 12. Univariate logistic regression for health symptoms

	Overall		Unexposed		Exposed	
	OR	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**
Exposed to hazards (Unexposed=ref)	1.21	0.87-1.67				
City (Hanoi=ref)						
Quang Ngai	**0.75**	**0.54-1.04**	0.43	0.07-2.51	0.80	0.56-1.14
Dong Nai	**0.62**	**0.44-0.87**	0.46	0.08-2.71	**0.61**	**0.43-0.87**
Can Tho	**0.36**	**0.25-0.51**	0.23	0.04-1.48	**0.35**	**0.25-0.51**
Immigration status (Local People=ref)	0.84	0.64-1.10	0.08	0.36-1.64	0.87	0.65-1.15
Education (High school or under= ref)	0.98	0.73-1.32	1.72	0.74-4.04	0.91	0.66-1.25
Number of children (0=ref)	1.15	0.81-1.63	1.15	0.43-3.02	1.18	0.81-1.72
Self-monthly income (Lowest=ref)						
Low	1.10	0.80-1.50	1.47	0.60-3.55	1.10	0.78-1.56
Medium	1.03	0.72-1.48	1.79	0.68-4.69	0.96	0.64-1.42
High	1.21	0.82-1.77	1.10	0.27-4.37	1.19	0.79-1.78
Type of factory (Clothing and textiles/ Leather shoes=ref)						
Mechanical/ Metallurgy	**0.95**	**0.67-1.33**	1.34	0.59-3.07	**0.89**	**0.61-1.28**
Electronics, Computers and Transportation	**0.13**	**0.90-1.75**	2.21	0.88-5.54	**1.14**	**0.80-1.69**
Food production	**0.73**	**0.50-1.05**	0.60	0.17-2.07	**0.73**	**0.49-1.07**
Others	**2.12**	**1.31-3.44**	0.72	0.06-8.46	**2.11**	**1.28-3.49**
Feeling exhausted (No=ref)	0.83	0.66-1.05	1.33	0.52-3.41	0.81	0.63-1.03

	Overall		Unexposed		Exposed	
	OR	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**
Years of working (<=10 years=ref)	1.60	0.92-2.77	1.84	0.31-10.79	**1.56**	**0.87-2.79**
EQ5D5L (No=ref)						
Having problems in mobility	**1.47**	**1.17-1.86**	0.65	0.35-1.19	**1.72**	**1.33-2.21**
Having problems in self-care	**1.67**	**1.32-2.11**	1.31	0.68-2.51	**1.72**	**1.33-2.22**
Having problems with usual activity	**1.79**	**1.42-2.27**	1.03	0.54-1.98	**1.93**	**1.50-2.49**
Pain/Discomfort	**1.95**	**1.54-2.49**	1.95	1.00-3.81	**1.99**	**1.53-2.58**
Anxiety/Depression	**1.79**	**1.40-2.28**	0.94	0.51-1.76	**2.01**	**1.54-2.62**
Depression (None-minimal=ref)						
Mild	**1.75**	**1.29-2.36**	1.29	0.62-2.66	**2.00**	**1.42-2.82**
Moderate	**1.55**	**1.16-2.07**	1.76	0.80-3.86	**1.55**	**1.13-2.12**
Moderately severe	**0.98**	**0.61-1.59**	2.36	0.51-10.92	**0.88**	**0.53-1.47**
Severe	**1.00**	**.**	.		**1.00**	**.**
Policies and procedure (Inadequate=ref)	**0.62**	**0.31-1.26**	0.75	0.19-2.95	0.58	0.25-1.34
Awareness (Inadequate=ref)	1.22	0.83-1.80	0.48	0.04-5.49	1.29	0.87-1.91

* Self-monthly income: We calculated the mean monthly income of each group: Lowest (1.000-4.000) Low (4.200-5.000) Medium (5.100-6.000) High (6.200-20.000)

** Quality of life was measured by using the EuroQol- 5 Dimensions- 5 Levels Vietnamese version and visual analog scale VAS score

***Depression was measured by using the Patient Health Questionnaire

****Occupational health and safety was measured by the Workplace health and safety survey

Regarding the unexposed group, there was no significant association between those variables found. Among the exposed group, working at Dong Nai and Can Tho city wá statistically significant protective factors. Odds of having health symptoms were 2.00 times higher (95% CI=1.42-2.82) for individuals who had "mild" depression, and 1.55 times higher (95% CI=1.13-2.12) for those having "moderate" depression than those who had "non-minimal" depression. Table 13, demonstrates the associated factors with the mental health of samples. Overall, worker worked in Can Tho, unexposed to hazards at workplace, had adequate policies and procedure at workplace; and had acceptable awareness about safety at worked showed statistically significant lower odds of having mental health (OR=0.55, 95% CI=0.39-0.77; OR=0.51, 95% CI=0.36-0.72; OR=0.35, 95% CI=0.16-0.77, and OR=0.32, 95% CI=0.21-0.50, respectively).

Regarding the unexposed group, workers in the "low" income group showed 7.06 times higher risk of having mental health problems than those in the "lowest" income group. Comparing to individuals who had no health problem, individuals had "1 or more" health problems reported a higher risk of having a problem in mental health (OR=1.94, 95% CI=1.02-3.70). Among those who had exposed to hazards, working in Can To city, worked at "food production" factories, had adequate policies and procedures, and

had acceptable awareness about occupational health and safety were protective factors for mental health issues. In contrast, those who had "1 or more" health problems, health symptoms, of had a problem in "self-care," "usual activity," "mobility",… were more likely to had a problem in mental health.

Table 13. Univariate logistic regression for mental health

	Overall		Unexposed		Exposed	
	aOR	**95% CI**	**aOR**	**95% CI**	**aOR**	**95% CI**
Exposed to hazards (Unexposed=ref)	**0.51**	**0.36-0.72**				
City (Hanoi=ref)						
Quang Ngai	**0.78**	**0.56-1.08**	0.64	0.11-3.73	**0.7**	**0.52-1.03**
Dong Nai	**0.89**	**0.64-1.24**	0.68	0.11-4.03	**0.9**	**0.61-1.22**
Can Tho	**0.55**	**0.39-0.77**	1.21	0.18-7.80	**0.4**	**0.27-0.57**
Immigration status (Local People=ref)	0.99	0.76-1.30	1.25	0.58-2.07	**0.95**	**0.71-1.26**
Education (High school or under = ref)	1.06	0.79-1.43	1.98	0.86-4.57	**0.97**	**0.70-1.33**
Number of children (0=ref)	1.26	0.89-1.79	0.99	0.36-2.72	**1.3**	**0.85-1.81**
Self-monthly income (Lowest=ref)						
Low	**1.32**	**0.96-1.80**	**7.06**	**2.54-22.7**	0.96	0.68-1.34
Medium	**0.77**	**0.54-1.10**	**0.92**	**0.35-2.40**	0.73	0.49-1.08
High	**0.79**	**0.54-1.16**	**1.41**	**0.34-5.83**	0.76	0.51-1.13
Type of factory (Clothing and textiles/ Leather shoes=ref)						
Mechanical/ Metallurgy	0.91	0.65-1.28	0.56	0.24-1.29	**1.01**	**0.70-1.47**
Electronics, Computers and Transportation	0.95	0.68-1.31	0.60	0.24-1.49	**1.05**	**0.74-1.50**
Food production	0.62	0.43-0.91	1.76	0.42-7.29	**0.61**	**0.41-0.91**
Others	1.01	0.64-1.58	1.00	.	**1.25**	**0.78-1.99**
Feeling exhausted	**1.77**	**1.40-2.24**	1.1	0.41-2.75	**1.85**	**1.45-2.36**

	Overall		Unexposed		Exposed	
	aOR	**95% CI**	**aOR**	**95% CI**	**aOR**	**95% CI**
Years of working (<=10 years=ref)	0.83	0.49-1.40	0.52	0.09-2.82	**0.89**	**0.51-1.54**
Health problem (0=ref)	**1.59**	**1.26-2.01**	**1.94**	**1.02-3.70**	**1.60**	**0.37-0.99**
Health symptoms (0=ref)	**1.55**	**1.23-1.95**	1.52	0.80-2.87	**1.59**	**1.24-2.05**
EQ5D5L (No=ref)						
Having problems in mobility	**1.53**	**1.21-1.92**	**2.86**	**1.47-5.55**	**1.37**	**1.07-1.76**
Having problems in self-care	1.20	0.95-1.52	0.92	0.47-1.83	**1.30**	**1.01-1.67**
Having problems with usual activity	**1.24**	**0.98-1.56**	0.74	0.38-1.47	**1.41**	**1.10-1.81**
Pain/Discomfort	**2.66**	**2.08-3.39**	**3.41**	**1.71-6.76**	**2.50**	**1.92-3.25**
Anxiety/Depression	**3.42**	**2.65-4.40**	**2.20**	**1.15-4.21**	**3.78**	**2.85-4.99**
Policies and procedure (Inadequate=ref)	**0.35**	**0.16-0.77**	0.94	0.22-3.94	**0.27**	**0.11-0.68**
Awareness (Inadequate=ref)	**0.32**	**0.21-0.50**	3.92	0.34-44.93	**0.27**	**0.17-0.43**

* Self-monthly income: We calculated the mean monthly income of each group: Lowest (1.000-4.000) Low (4.200-5.000) Medium (5.100-6.000) High (6.200-20.000)

** Quality of life was measured by using the EuroQol- 5 Dimensions- 5 Levels Vietnamese version and visual analog scale VAS score

***Depression was measured by using the Patient Health Questionnaire

****Occupational health and safety was measured by the Workplace health and safety survey

Table 14. Factors associated with the health status of industrial worker

	Depression		Health problem	
	OR	**95% CI**	**OR**	**95%CI**
City (Hanoi=ref)				
Quang Ngai			1.80***	(1.20 - 2.71)
Dong Nai			0.81	(0.53 - 1.23)
Can Tho			0.30***	(0.20 - 0.44)
Type of factory (Clothing and textiles/ Leather shoes=ref)				
Mechanical/ Metallurgy			0.63*	(0.38-1.04)
Electronics, Computer and Transportation			0.59**	(0.35-0.97)
Food production			0.47***	(0.29-0.76)
Other			0.77	(0.46-1.29)
Feeling exhausted (No=ref)	**2.33*** **	(1.60-3.42)		
Years of working (<=10 years=ref)			0.58*	(0.32 - 1.05)
Health problem (0 =ref)	1.38**	(1.03 - 1.85)		
Health symptom (0=ref)	1.51***	(1.13 - 2.03)	2.27***	(1.70 - 3.02)
Depression (Non-minimal=ref)				
Mild			**1.58** **	(1.09 - 2.30)
Moderate			1.06	(0.74 - 1.53)
Moderately severe			1.25	(0.65 - 2.41)

	Depression		Health problem	
	OR	**95% CI**	**OR**	**95%CI**
EQ5D5L (No=ref)				
Having problems in mobility	2.27***	(1.44 - 3.58)	1.22	(0.82 - 1.81)
Having problems in self-care	0.53*	(0.27 - 1.04)		
Having problems with usual activity	0.70	(0.38 - 1.29)	1.42	(0.92 - 2.20)
Anxiety/Depression	4.19***	(3.03 - 5.80)	1.53**	(1.09 - 2.14)
Vulnerability (No=ref)	8.64**	(1.32 - 56.37)		
Policies (Inadequate=ref)	0.35**	(0.13-0.95)	0.52	(0.24 - 1.14)
Awareness (Inadequate=ref)	0.27***	(0.14 - 0.52)		

*p<0.1, **p<0.05, ***p<0.001

[a] Self-monthly income: We calculated the mean monthly income of each group: Lowest (1.000-4.000) Low (4.200-5.000) Medium (5.100-6.000) High (6.200-20.000)

[b] Quality of life was measured by using the EuroQol- 5 Dimensions- 5 Levels Vietnamese version and visual analog scale VAS score

[c] Depression was measured by using the Patient Health Questionnaire

[d] Occupational health and safety was measured by the Workplace health and safety survey

Table 14 displays an adjusted model for the associated factors with depression, health problems, and health-related quality of life of the sample. After adjusting for all the variables, the regression model illustrated that individuals who had more than one health problem are more likely to have depression (OR=1.45, 95%CI=1.11-1.99, respectively). Besides, respondents had one or more health symptoms experienced 1.38 times higher odds (95%CI=1.03-1.85) of having health problems compared to those who not and were also likely to have a lower EQ-5D index (Coef=0.70, p-value<0.001). Moreover, those who had problems immobility, anxiety, and being vulnerability experienced the higher odds of having depression.

In contrast, workers had adequate awareness about safety at workplaces had less chance to suffered depress, and were also likely to have a higher EQ-5D index (Coef=2.71, p-value<0.001). Workers had adequate policies and procedures at the workplace were found to have a higher EQ-5D index than the others (Coef=2.81, p-value<0.001). Among participants, compared to Hanoi, workers in Quang Ngai statistically reported a higher risk of having a health problem (OR=1.80, 95%CI=1.20-2.71), while individuals in Can Tho were less likely to had a health problem (OR=0.3, 95%CI=0.2-0.44).

The association between health-related quality of life is showed in Table 15. We found an association between the demographic characteristics of workers and the EQ-5D index and EQ-VAS. Comparing with factories in Hanoi, factories located in Can Tho showed significantly lover EQ-5D index ($p<0.001$), while those in Quang Ngai reported lower EQ-VASS scores ($p<0.001$). Feeling exhausted about the current job was strongly associated with overall health-related quality of life among respondents. Workers who felt exhausted were reported lower scores in both the EQ-5D index ($p<0.001$) and EQ-VAS ($p<0.001$) score compared to others. Marital status and having children had a weak relationship with the quality of life of the participants. Workers who had more than one health symptom or health problem significantly reported a lower quality of life ($p<0.001$, $p<0.05$; respectively). There was a linkage between having adequate to assess the policies and acceptable awareness about occupational health and safety at the workplace and EQ-5D index score. Compared with respondents who had inadequate policies and awareness, those can assess the policies and had awareness about safety at the workplace showed a higher score of quality of life.

Table 15. Factors associated with EQ-5D index and EQ-VAS in industrial workers

Domain	EQ5D5L		EQ-VAS	
	Coef	95% CI	Coef	95% CI
City (Hanoi=ref)				
Quang Ngai	0.04*	(-0.01;0.06)	-2.73	(-5.10;1.63)
Dong Nai	-0.05	(-0.01;0.08)	-18.50***	(-24.08;-13.67)
Can Tho	0.19***	(-0.11;0.02)	-1.25	(-14.02;-4.31)
Self-monthly income (Lowest=ref)				
Low	-0.11***	(-0.15;-0.07)	-4.42**	(-8.77;-0.07)
Medium	-0.01	(-0.05-0.14)	-4.19*	(-8.98-0.59)
High	0.05*	(0.00-0.10)	0.60	(-4.84;6.04)
Feeling exhausted (No=ref)	-0.08***	(-0.13;-0.04)	-18.87***	(-24.08;-13.67)
Marital status (Single=ref)			-3.13*	(-6.80;0.54)
Number of children (0 =ref)	-0.03*	(-0.06;0.00)		
Health problem (0=ref)	-0.05**	(-0.09;-0.02)		
Health symptom (0=ref)	-0.09***	(-0.12;-0.06)		
Hazards exposure (No=ref)	-0.09**	(-0.15;-0.03)		
Policies (Inadequate=ref)	0.27***	(0.18;0.37)		
Awareness (Inadequate=ref)	0.31***	(0.23;0.38))		

*p<0.1, **p<0.05, ***p<0.001

[a] Self-monthly income: We calculated the mean monthly income of each group: Lowest (1.000-4.000) Low (4.200-5.000) Medium (5.100-6.000) High (6.200-20.000)

[b] Quality of life was measured by using the EuroQol- 5 Dimensions- 5 Levels Vietnamese version and visual analog scale VAS score

[d] Occupational health and safety was measured by the Workplace health and safety survey

5. Discussions

Our research is one of the first studies to update and investigate the current situation of working conditions, occupational health and safety; and industrial workers' quality of life in Vietnam. Industrial factories in Vietnam had acceptable regulations about OSH to increase workers' safety, health and rights. However, these workers still had to face multiple hazards at the workplace included: exposed to chemicals, dust, high level of noise, or lift and carry the heavy items. We also found a significantly higher chance of having depression among workers with a problem in physical health, and also observed the lower quality of life among workers having inadequate awareness and inadequate access to occupational health and safety policies and procedures. There is still a gap between OSH law and regulation and the implementation in real situation. Furthermore, our findings can contribute to the health and health-related quality of life, which can be the baseline for future studies to improve the working condition and occupational health and safety for factories' workers in Vietnam.

5.1. Working environments and occupational health safety in industrial factories in Vietnam

Our study results have demonstrated a high prevalence of hazard exposure at workplaces among industrial workers in Vietnam. Workers in the clothing and textiles sector reported a higher proportion of hazard exposure and had more health problems and health symptoms. This finding is in line with the previous studies, which also indicated that illness and injuries become the results of occupational hazards among workers in those types of factories [39, 40]. Similarly, previous studies in Vietnam also revealed that occupational safety in Vietnam still needs to enhance in terms of identifying the risk at the workplace and the work-related injuries procedures [18]. Moreover, they also indicated that the current OSH system in Vietnam is well organized in theory. Nevertheless, the sufficient of this system is still needs to increase due to the inadequate OSH information, inappropriate OSH administrative system and the workers did not recognize their risks at the workplace, even when they were aware of OSH [20, 40]. While the modern technologies and machines was imported, it can lead to new type of occupational diseases. However, the current OSH legal system cannot keep pace with the rapid changes in the country's economic-social sectors. Moreover, one of the biggest problems in the Vietnamese context is the lack of information. The previous report indicated that social

responsibilities had failed to protect workers' rights and health [4]. The authors mentioned that there were several issues in the industrial factories in Vietnam included temperatures exceed limits of Vietnamese law, backless benches for thousands of sewing machine operators; lack of anti-fatigue mats for workers standing all shift, improper use of hearing protection [4], and they covered all the information of hazardous condition [4, 41]. The familiar hazardous workers had to experience during their working days were dust, too noisy, standing or sitting more than 2 hours, had to do with your hands or wrists to packing, sorting cleaning or pushing for at least 3 hours during the day. This can be explained by the new technologies with a big machine and automatically movement force workers had to work continuously at high speed and repeat their movements [42].

In addition, the majority of respondents working at clothing and textile factories answered that dust and noise are the most dangerous risks for Vietnamese workers [43, 44]. It is clear to see that most of the respondents reported they had exposure to at least one hazard at work and nearly 50% of them felt exhausted about their job (figure 2 and figure 3). However, they still indicated that the OSH policies and procedures at their workplace are acceptable. The possible explanation can be in the context of industrialization, Vietnamese workers had to accept to choose a heavy job,

even they had to exposed to the hazardous climate workplace to earn more money [20]. The reason is that more than half of the samples are young workers. They might have the necessary awareness about OSH and have their own views of safety. Nonetheless, they might lack experiences in judgment and problem solving and might not recognize the danger in the workplace. This result was in line with the previous study about occupational health and safety issues affecting the young laboures. They also demonstrated that young employees might have less knowledge and less intention to adopt safe behavior [45]. Besides, this result can show the current occupational regulation in factoties in Vietnam was well organized in theory, however, it was not well implement in real situation, where workers still have to accept the endanger environment without recognized the risk.

On the other hand, the perception toward safety at work is differences among each individuals [46], the assumption about the working condition might be similar among workers at the same factories, however, it can be changed at the individual level [46]. Furthermore, our finding also might be affected by the healthy worker effect phenomenon which is supported that to ensure employment; industrial workers need to maintain their healthy health to ensure the employment or the factories prefer to hire

health workers instead of people with poor health [47, 48]. Beside the physical working conditions, the monthly income also is a problem that affects workers' life. In comparison with the other sectors; industrial workers had the lower-income [44]. In our study sample, the monthly income of most of the participants was in the lowest (1.000-4.000 Vietnamese thousand dong) and low (4.200-5.000 Vietnamese thousand dong) groups. However, the individual monthly income in this sample is quite high compared to the average income of Vietnamese residents (2.360 Vietnamese thousand dong) [49]. This difference is understandable due to the period of the previous study was in 2015, when the economy was increasing faster, it led to the monthly income growth per capita. Followed the Section 2, Article 16 of the Law on Occupational safety and Health in Vietnam, they indicated that factories had to ensure the requirements pertaining to space, clearance, dust, steam, noxious gases, radioactivity, moisture, noise, vibration or other dangerous factors in relevant technical standards and regularly measured [12]. However, the implementation of this section was not covered in real life. Workers still had to exposed with the exceeded temperature, low hygiene, and dangerous materials at workplaces.

To sum up, our findings suggest that there is a need to improve the working condition in industrial factories in Vietnam, especially the

politician should focus more on occupational risk management at the workplace to enhance the working condition. Furthermore, the provincial preventive medicine centers needed to monitor working condition and work-related diseases in agreement with the national standards.

5.2. Health status, depression and associated factors among industrial workers

At workplaces, workers have to exposed to many hazardous materials and endanger working conditions which can threaten their health. The outcome from our study denotes interestingly higher a mean number of health problems among the sample compared to other studies (Mean =6.2), while the result from Bach. X. T showed that the mean number of health problems amongst workers in his study was 1.91 [30]. Apart from this slight non-alignment, the result is acceptable due to the differences in sample size and demographic characteristics. In the previous study, they conducted their study in the most developed industrialization in the Northern of Vietnam among industrial workers while our research was conducted in four cities from North to South. Nevertheless, the evidence from our research shares the similarity with earlier work in India and Iran which was industrial workers were more likely to be health vulnerabilities at the workplace [41, 50, 51]. Besides, human resources working in the occupational health

networks were lack of experience due to organizational and personnel level transfers. This can be a problem when the occupational accidents are happened at the workplace, they might not know how to react with the situation.

After adjusting for the possible confounding factors, our results confirmed the previous literature that food preparation workers reported lower physical health problems than the factories of clothing and textile's workers. In contrast, workers with mental health problem experienced more physical health problem. This finding can be explained by workers in the food production industries had a lower index of depression after the service industries which had positive association with physical health's problem [22, 51]. While workers in other type of factories such as constructions industry or chemicals industry were more depressed because they have to exposed to more hazardous material or work under the difficult working environment [51]. This result also supports the previous study in India, indicating the higher prevalence of injuries in the textile manufacturing industries and workers in the clothing factories are experienced in more hazardous working conditions than other industries [42, 50]. Additionally, in Vietnam, the clothing and textiles leather shoes are very profitable, making this field to be one of the most developing industries. Nonetheless,

workers in those factories had to expose more hazardous such as dust, noise, working with big machines and more pressure than the food industry which directly affect physical health and lead to the potential of depression.

Beside physical health, mental health also is one of the health problems among workers [22, 50-52]. More than half of the sample reported the mental health problems from mild to severe conditions, which is related to the quality of life, satisfaction about their job, physical and the policies and procedure at the workplace. This result is in place with the study on depressive symptoms amongst industrial workers in Vietnam by Tran. X. B. Their results also reveal the high prevalence of mental health problems among workers in the industrial factories in Vietnam [28]. However, compared to previous studies, our finding indicates a much higher prevalence of depression among respondents. The percentage of depression workers in Bach et al. was 38.6% [28], in Thailand was 33.7% [53], Netherland was nearly 33% [27] and much higher than the combined ten most common mental disorders in Vietnam [54]. The study from Minsung Sohn denotes the prevalence of workers had depressive symptom exceed to somewhere in the vicinity of 86.4%. [55] She suggested that depression was influenced by the working condition and the psychosocial environment. Moreover, those who had low job control, and low social support are more

likely to have a mental health problem [55]. Furthermore, some potential factors associated with the harmful mental health of workers we found from this study: anxiety [28, 55], having physical health problems [22, 28]. On the other hand, workers had inadequate assess to policies and procedure at workplace, and unacceptable awareness about occupational health and safety was found experienced more harmful depressive symptom, which is consistence with previous research that has found workers at factories with lack of procedural and regulation; and not aware about OSH safety have higher chance to developed depressive symptom [5, 26, 53].

Taking these findings together, it is reasonable that factors associated with worker's health and adequate health check-up program development are needed. The previous study in Vietnam mentioned that to minimize the prevalence of depression and enhance the physical health of industrial workers, those factories should ensure that the workplace is safe by accomplish the hazardous, encourage workers to have the health examination frequently, and also the manager in factories should support their workers in daily life [28].

5.3. Health-related quality of life among industrial workers and associated factors

Our research examined the quality of life of the participants by two indexes included EQ5D-5L index and EQ-VAS index, which is assessed the perception of workers in terms of physical, psychosocial, social condition and the self-rated score of their health status. Previous studies suggested that workers' HRQOL was determined by demographic characteristics, morbidities, working environment, personal behaviors, and social cohesion [29, 30]. Hence, in our study, morbidities condition, job satisfaction, hazards exposure, regulation from the workplace and awareness of workers are strongly associated with their QOL.

After adjusting for the possible confounders variables, our results indicate that compared to Hanoi, workers in Quang Ngai experienced the poorer quality of life, but workers in Can Tho had the better one. These results can be explained by looking at the current situation of economic growth in each city. Quang Ngai is located in the central of Vietnam, where four multi- economic zones are placed. This multi-sectoral economic zone most focus on large-scale heavy industries such as mechanical engineering and cement producing and equipment manufacturing where worker have to do their job with big and heavy machine [56, 57]. In contrast, Can Tho city is

most concentrated in the high-tech factories to produce the small electronic components [58] which is less affected to worker's health compared to other types of factories [50].

Furthermore, the association between individuals' monthly income and HRQOL also was found in our study. We expected the higher socio-economic status might increase the QOL. Also, the previous research indicated the relationship between the psychological working conditions and quality of life, which suggests that the decreased income associated with the increase of poor HRQOL [59]. However, an unexpected outcome was found in our study in the relationship between the income and the QOL of respondents. The connection between individual monthly income and the HRQOL was not clearly in our findings. HRQOL only associated with workers in a low-income group compared to those who have the lowest monthly income. The results also showed workers in low-income groups experienced poorer quality of life compared to the worker in the lowest income group.

The working environment and job satisfaction also affected to the HRQOL. Workers who are not satisfied with their current jobs reported both lower EQ5D-5L index and EQ-VAS score compared to those feeling good about their jobs. This finding supports the earlier work of Faragher, which

mentioned that job satisfaction strongly associated with the depression problem among workers [60]. Current findings suggest that the more hazards exposure, the lower QOL among industrial employees. Previous researches in four countries in ASEAN also conclude the relationship between workplace hazards and QOL. The authors revealed that working environments included prolong unusual activities, unsafe working position, and exposed to the chemical materials lead to lower QOL [29]. Our results also are consistence with the work from Bach et al., which is determined that exposing to the hazardous at the workplace (noise, dust, smoke, etc.) had both lower EQ5D-5L index and EQ-VAS score [30]. This outcome is because of the more hazardous of working environments might affect the physical health of workers, which can lead to lower HRQOL. Curiously, our present outcome denoted a lower EQ5D-5L index in both sexes compared to the index of the general population of Vietnam (mean= 0.91) [61]. The differences may be accounted for by industrial labourers have to work under endanger working conditions with the lower income, which disturbed both physical and psychological of the workers. In contrast, our sample showed higher QOL compared to the previous study in Vietnam among industrial workers (mean=0.74) [30]. The differences in the sampling method between two studies while our study conducted in four cities from North to South of Vietnam to increase the representation of industrial workers in the whole country.

Finally, current research also indicated that workmen who worked at factories have inadequate policies and procedures about safety at the workplace, and are not aware of occupational health experience poorer QOL. Our study denoted much lower prevalence of inadequate policies and awareness compared to an earlier study (Inadequate of policies and procedure 46.14%; inadequate awareness 25.21%) [38], while our sample reported more than 80% of participants exposed to hazards, much higher compared to other studies [38]. Earlier studies propose that the overall vulnerability much higher among younger workers, permanent workers because younger workers are more sensitive to the working condition. They might lack of awareness and experiences compared to older workers [38, 62]. These different findings can be understood in several explanations. First of all, our questionnaire to examined the vulnerability at the workplace of workers was modified from the original version, which we included several questions to fit the Vietnam situation. Meanwhile, concentrating on the population, the original questionnaire was applied in Canadian employees [37, 38], and another version was used for the better work assessment tool global in the Vietnamese version [35]. This may lead to the fact that Vietnamese workers might not be sensitive about hazardous at the workplace, and they might not fully understand the influences of the working conditions on their health. Secondly, as the result of the

organization, there is a possible ability worker does not want to report problems at the workplace because it can affect their jobs.

Cooperatively, our research about the working condition in industrial factories in Vietnam, and the associated factors for the workers' health generate several implications. After the “Doi Moi” period, the Vietnam industry has changed with many new industrial zones and applied numerous new technologies into manufacturing in the whole country. This research is one of the first studies examined and updated the current working conditions in industrial factories in Vietnam after a long period. Currently, the environment at the workplace is worrying about issues where employees have to face daily hazardous at work. Therefore, the clearly regulations in terms of risk assessment at the workplace are highly recommended. Furthermore, in the context of the Vietnam situation where labourers have to accept the heavy job to ensure their income, the government and politicians should develop and implement the law to protect workers' rights. Moreover, the education program should take in advance in factories to guarantee all the workers can fully understand their rights and responsibility to keep their daily working environment as safe as possible and completely follow the instructions of occupational health and safety. To add, to solve the problem related to the quality of life of workers, those factories should

consider organizing some outdoor activities, rearranging the work shift and increasing the job satisfaction of workers.

5.4. Limitation

There are several sources for possible error should indicate since it may affect the explanation of our results. The data were collected in a cross-sectional study in 2019, so it is not possible to conclude the causal relationship between the working environment and the health status of the participants. Secondly, the study subjects might not representative due to the convenience sampling method. Thirdly, due to the characteristic of the target population, our study involves the issue of industrial workplaces, while we include a survey that assesses many factors of the working environment but may still have other factors that affect the occupational health of industrial workers as well as the social support in the factory, job insecurity. There was also a missing answer that accounted for workers declined to give some information, which may disturb the justification of the study. Finally, as mentioned above our questionnaire mainly used the part of the original version from the survey developed for Canadian workers. Then we combined with other Vietnamese version tool in the context of Vietnam, it might lead to the differences in the results of our study.

Besides these limitations, our research has drawn several implications. First of all, this is the first study to update the situation of the working environment in Vietnam. The finding can raise attention from the government to improve the conditions at the workplace by clarifying the hazardous and reduce the risks. To reduce the gap between the current OSH law and the implementation in real life, we suggest to revise, reform and complete the legislative documents on OSH. Build and consolidate databases and a national information network for OSH. Also, keep raising more fund to develop the compensation fund for occupational accidents and occupational diseases. Since the knowledge and awareness about right and responsibility at the workplace are important and vital, the consistent education program on health, identified the risk should be accompanied to increase the knowledge of employees for better physical health and mental health. Additionally, the empowerment of workers in the workplace is also necessary. The factory should involve their workers while developing the regulations to ensure safety in their company. Enhance the consultations, technical support and investments aimed at preventing occupational accidents in branch/industry which have high risk of occupational problem, such as clothing and textile factories, manufacturing sectors. Encouraging their workers to recognize and give the opinions to increase safety at work. Finally, it is necessary to conduct a qualitative study in the future to fully understand the association between the environment at the workplace and workers' health and quality of life.

6. Conclusion

Our study highlights the high prevalence of hazard exposure among industrial workers. Moreover, the controllable factors as working conditions, occupational health, and safety are still affected by the health status of workers. This study will benefit the community, that supports the occupational condition for workers and future research for the safety behavior in the workplace and implication to improve the health-related to occupational condition for industrial employees in Vietnam. We also suggest the further research and application of science/ technology in labor protection. The valuable results of the study could support the development policies and action plans toward occupational in the workplace if there is any yet needs to improve.

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Appendix 1: Ethics

TRUNG ƯƠNG ĐOÀN TNCS HỒ CHÍ MINH
VIỆN NGHIÊN CỨU THANH NIÊN
***
Số: 04a QĐ/VNCTN

Hà Nội, ngày 7 tháng 01 năm 2019

QUYẾT ĐỊNH
V/v phê duyệt cá nhân và đơn vị chủ trì thực hiện đề tài nghiên cứu khoa học cấp Viện năm 2019

LÃNH ĐẠO VIỆN NGHIÊN CỨU THANH NIÊN

- Căn cứ Quyết định số 187a QĐ/TWĐTN- VNCTN ngày 28/12/2018 v/v điều chỉnh danh mục và phân bổ kinh phí thực hiện nhiệm vụ thường xuyên theo chức năng của Viện Nghiên cứu Thanh niên;

- Căn cứ Qui chế tổ chức và hoạt động của Viện Nghiên cứu Thanh niên;

- Căn cứ Kế hoạch công tác chuyên môn năm 2019 của Viện Nghiên cứu Thanh niên;

- Xét đề nghị của Phòng Quản lý khoa học, Viện Nghiên cứu Thanh niên.

QUYẾT ĐỊNH

Điều 1: Giao nhiệm vụ cho nhóm nghiên cứu gồm các đồng chí: Nguyễn Tuấn Anh, Nguyễn Thị Quỳnh Hoa, Bùi Phương Thanh, Trần Thu Ngân, Nguyễn Văn Quý thực hiện đề tài "***Điều tra tình trạng sức khỏe và nhu cầu chăm sóc y tế của thanh niên công nhân làm việc tại các KCN, KCX hiện nay***", mã số KXVTN 19-01.

Điều 2: Giao cho nhóm nghiên cứu là đơn vị chủ trì thực hiện đề tài.

Điều 3: Chủ nhiệm và đơn vị chủ trì đề tài có trách nhiệm:

- Xây dựng và hoàn thiện hồ sơ, thủ tục có liên quan để ký Hợp đồng theo đúng qui định hiện hành.

- Thực hiện đúng nhiệm vụ, nội dung, tiến độ theo kế hoạch đã được Hội đồng Khoa học Viện Nghiên cứu Thanh niên phê duyệt.

- Phối hợp cùng Phòng Quản lý Khoa học tổ chức nghiệm thu sản phẩm với Hội đồng khoa học Viện theo Hợp đồng đã ký kết.

Điều 4: Chủ nhiệm, đơn vị chủ trì và các phòng có liên quan căn cứ Quyết định thi hành./.

Nơi nhận:
- Như điều 1
- Lưu Phòng TH, QLKH

VIỆN TRƯỞNG

VIỆN NGHIÊN CỨU THANH NIÊN

Đỗ Ngọc Hà

Appendix 2: Questionnaire in Vietnamese version

TRUNG ƯƠNG ĐOÀN TNCS HỒ CHÍ MINH

VIỆN NGHIÊN CỨU THANH NIÊN

PHIẾU TRƯNG CẦU Ý KIẾN

Bạn thân mến,

Viện Nghiên cứu Thanh niên đang thực hiện một cuộc điều tra về tình trạng sức khỏe và nhu cầu chăm sóc y tế của thanh niên công nhân. Khi tham gia nghiên cứu, những thông tin Bạn cung cấp là vô cùng quan trọng. Xin bạn vui lòng trả lời những câu hỏi sau một cách trung thực bằng cách khoanh tròn hoặc đánh dấu (X) vào các phương án trả lời. Chúng tôi xin đảm bảo rằng nhóm nghiên cứu sẽ không tiết lộ bất cứ thông tin cá nhân nào của Bạn tới lãnh đạo nhà máy cũng như bất kì ai khác.

Xin chân thành cảm ơn!

Trước khi tiến hành nghiên cứu, Bạn đồng ý tham gia nghiên cứu này chứ?

1. Đồng ý 2. Từ chối => Dừng điều tra

THÔNG TIN CHUNG

A1. Năm sinh:……

A2. Giới tính: 1. Nam

2. Nữ

A3. Bạn đã hoàn thành hết cấp học nào?

1. Cấp 1 – Tiểu học
3. Cấp 2 – Trung học cơ sở
4. Cấp 3 – Phổ thông trung học
5. Trung cấp, cao đẳng
6. Đại học
7. Sau đại học

A4.Tình trạng hôn nhân của bạn?

1. Độc thân
2. Sống với vợ/ chồng
3. Sống chung như vợ/ chồng với người khác, chưa kết hôn
4. Ly dị/Ly thân
5. Góa

A5. Hiện nay bạn có mấy con? …… con

A6. Bạn có phải là người địa phương này không?

1. Là người địa phương này
2. Là người địa phương khác đến

A7. Hiện tại, nơi bạn đang sống là:

1. Nhà riêng
2. Nhà thuê, nhà trọ
3. Kí túc xá
4. Khác:……

A8. Bạn hài lòng với mức độ tiện nghi nơi mình đang sinh sống ở mức độ như thế nào? *(0 điểm là hoàn toàn không hài lòng, 10 điểm là hoàn toàn hài lòng):* ……..…… điểm

A9. Bạn hài lòng với mức độ vệ sinh và nước sạch nơi mình đang sinh sống ở mức độ như thế nào? *(0 điểm là hoàn toàn không hài lòng, 10 điểm là hoàn toàn hài lòng):* ……..…...… điểm

A10. Nhìn chung, bạn hài lòng với nơi mình đang sinh sống ở mức độ như thế nào? *(0 điểm là hoàn toàn không hài lòng, 10 điểm là hoàn toàn hài lòng):* ……..…… điểm

A11. Hiện tại bạn có sống cùng ai không? (*Có thể chọn nhiều đáp án***)**

1. Bố, mẹ
2. Vợ/Chồng
3. Con
4. Anh/chị/em ruột
5. Anh/chị/em họ
6. Đồng nghiệp
7. Khác:……..

A12. Trong 1 năm qua, thu nhập trung bình hàng tháng của cá nhân bạn là: ……...đồng/tháng

A13. Bạn hài lòng với mức thu nhập của mình như thế nào? *(0 điểm là hoàn toàn không hài lòng, 10 điểm là hoàn toàn hài lòng):* ……..…… điểm

B. TÌNH HÌNH CÔNG VIỆC

B1. Công ty bạn làm sản xuất mặt hàng gì?

1. May/giày da 4. Chế biến thực phẩm

2. Cơ khí/luyện kim 5.

3. Lắp ráp linh kiện Khác:……..

điện tử, phương tiện

B2. Bạn đã làm ở đây được bao lâu rồi? …….. năm……. Tháng

B3. Trung bình một ngày bạn làm việc mấy tiếng? ……. tiếng

B4. Bạn cảm nhận như thế nào trong quá trình làm việc? *(Chọn 1 đáp án)*

1. Tôi rất hứng thú với công việc, tôi không bao giờ bị kiệt sức

2. Thi thoảng tôi thấy stress, ít năng lượng để làm việc, nhưng tôi chưa bao giờ thấy kiệt sức

3. Tôi chắc chắn đang bị kiệt sức, cả về thể chất và tinh thần

4. Tôi bị kiệt sức ngày qua ngày, và tôi thường thất vọng với công việc của mình

5. Tôi thấy hoàn toàn bị kiệt sức và thường nghĩ đến nghỉ việc. Tôi cần thay đổi hoặc cần trợ giúp

B5. Bạn hãy cho biết, môi trường làm việc của bạn có những vấn đề sau không?*(Mỗi hàng ngang chọn 1 ý)*

Đặc điểm	3 tháng một lần	Hàng tháng	Hàng tuần	Hàng ngày	Không bao giờ	Không biết
1. Phải tự nhấc, mang vác vật nặng hơn 20kg ít nhất 10 lần một ngày						
2. Thực hiện các động tác lặp đi lặp lại bằng tay hoặc cổ tay của bạn (đóng gói, phân loại, lắp ráp, làm sạch, kéo, đẩy, gõ) trong ít nhất 3 giờ một ngày						
3. Thực hiện các nhiệm vụ công việc hoặc sử dụng các phương pháp công việc mà bạn không thấy thoải mái						
4. Làm việc trong tư thế làm việc uốn cong, xoắn.						
5. Làm việc ở độ cao từ 2 mét trở lên so với mặt đất hoặc sàn nhà						
6. Làm việc ở mức độ ồn cao đến mứcphải cao giọng khi nói chuyện với những người ở cách xa chưa đến một mét						
7. Làm việc ở nơi quá nóng hoặc quá lạnh						
8. Nơi làm việc không được cung cấp đầy đủ ánh sáng						
9. Môi trường làm việc có nhiều bụi (bụi bông, bụi than, quặng, bụi gỗ, bụi kính, bụi da…)						
10. Phải đứng hoặc ngồi liên tục nhiều hơn 2 giờ						
11. Làm việc ca đêm						
12. Tiếp xúc với các loại khói (khói than, khói hàn, khói thuốc, khói đốt các loại khí thải…)						
13. Tiếp xúc với các hoá chất (chất nhuộm màu, sơn màu), chất độc hại (thuốc trừ sâu…)						
14. Tiếp xúc với các chất dễ cháy (gas, diesel…)						
15. Tiếp xúc với các thành phần như cao su, sản phẩm nhựa						

B6. Bạn hãy cho biết những hoá chất, chất độc hại dễ cháy nổ tại nơi làm việc của anh chị được cảnh báo và lưu trữ như thế nào? *(Mỗi hàng ngang chọn 1 ý)*

Câu hỏi	Rất không đồng ý	Không đồng ý	Bình thường	Đồng ý	Không Đồng ý
1. Hoá chất và chất độc hại có được dán nhãn đầy đủ					
2. Có thể đọc và hiểu được các nhãn dán trên vỏ đựng hoá chất					
3. Hóa chất và các chất độc hại được lưu trữ đúng cách					
4. Tại nơi làm việc, có bảng hướng dẫn về việc sử dụng an toàn hóa chất cho các hóa chất nguy hiểm đang được sử dụng					
5. Quy trình đánh giá, giám sát, hạn chế tiếp xúc với hóa chất và chất độc hại của công nhân được xây dựng và thực hiện					
6. Công nhân được hướng dẫn về quy định khi an toàn làm việc với hóa chất và các chất độc hại.					
7. Công nhân được cung cấp đầy đủ thiết bị rửa và vật liệu tẩy rửa trong trường hợp tiếp xúc với hóa chất độc hại					

B7. Xin hãy nêu ý kiến của bạn về những chính sách, quy định và quy trình hiện có ở nhà máy nơi bạn làm việc đang được thực hiện để đảm bảo an toàn và sức khoẻ nghề nghiệp cho công nhân? *(Mỗi hàng ngang chọn 1 ý)*

Vấn đề	Rất không đồng ý	Không đồng ý	Bình thường	Đồng ý	Không Đồng ý
1. Làm việc an toàn cũng quan trọng như việc đảm bảo chất lượng công việc và hoàn thành công việc đúng giờ					
2. Những người chịu trách nhiệm về việc đảm bảo an toàn lao động cho công nhân có thể thực hiện những sự thay đổi mà họ cho là cần thiết					
3. Công nhân và quản lý có thể cùng trao đổi để đảm bảo môi trường làm việc an toàn nhất					
4. Sự an toàn của công nhân là rất quan trọng					
5. Nhà máy sẽ có biện pháp giải quyết nhanh					

chóng khi xảy ra những vấn đề liên quan đến an toàn lao động					
6. Nhà máy lắng nghe ý kiến của công nhân về việc tăng cường an toàn lao động					
7. Việc kiểm tra an toàn lao động được thực hiện định kỳ tại nhà máy					
8. Những công nhân tuân thủ đảm bảo an toàn lao động được nhận phản hồi tốt từ quản lý					
9. Những công nhân không tuân thủ đảm bảo an toàn lao động sẽ nhận được thông báo					
10. Công nhân được kiểm tra định kì về việc tuân thủ đảm bảo an toàn lao động					
11. Mọi công nhân đều được cung cấp đầy đủ thông tin về an toàn lao động					
12. Mọi công nhân có thể hiểu được những thông tin được cung cấp về an toàn lao động					
13. Công nhân mới sẽ được đào tạo về an toàn lao động và nhắc nhở thực hiện theo đúng yêu cầu					
14. Nhà máy dành nhiều thời gian để hướng dẫn công nhân thực hiện đảm bảo quy trình an toàn lao động					
15. Nhà máy sẽ đảm bảo công nhân hiểu về quyền lợi và nghĩa vụ của mình khi thực hiện theo đúng quy trình an toàn lao động					

B8. Xin bạn cho biết ý kiến của bản thân về những vấn đề sau: *(Mỗi hàng ngang chọn 1 ý)*

Câu hỏi	Rất không đồng ý	Không đồng ý	Bình thường	Đồng ý	Không Đồng ý
1. Công nhân hiểu về quyền và trách nhiệm của mình về việc đảm bảo sức khoẻ và an toàn lao động					
2. Tôi biết cách để thực hiện công việc của mình một cách an toàn					
3. Nếu tôi cảm thấy có vấn đề liên quan đến an toàn lao động tôi biết cần tìm đến ai để báo cáo					
4. Tôi có kiến thức để xử lý trong một vài trường hợp liên quan đến an toàn lao động					
5. Tôi biết những điều cần thiết và nên làm để					

Câu hỏi	Rất không đồng ý	Không đồng ý	Bình thường	Đồng ý	Không Đồng ý
đảm bảo an toàn trong quá trình làm việc của tôi					

C. TÌNH TRẠNG SỨC KHỎE CHUNG VÀ SỨC KHỎE THỂ CHẤT

C1. Bạn hãy trả lời 5 câu hỏi về tình trạng sức khỏe ngày hôm nay. Bạn hãy khoanh tròn vào đáp án phù hợp với tình trạng của bạn. *(Mỗi hàng ngang chọn 1 ý)*

Trong ngày hôm nay……..	**Vô cùng khó khăn, không thể làm được**	**Khó khăn rất nhiều**	**Tương đối khó khăn**	**Có khó khăn chút ít**	**Không hề khó khăn**
1. Bạn có gặp **khó khăn khi đi lại** không?	1	2	3	4	5
2. Bạn có gặp **khó khăn trong việc tự chăm sóc** như *tắm rửa, mặc quần áo* cho mìnhkhông?	1	2	3	4	5
3. Bạn có gặp **khó khăn trong làm các công việc thường ngày** như *đi làm, đọc, viết hay việc nhà* không?	1	2	3	4	5
	Vô cùng nhiều	**Rất nhiều**	**Tương đối nhiều**	**Một chút**	**Không hề cảm thấy**
4. Bạn cảm thấy **đau đớn, khó chịu** ở mức độ nào?	1	2	3	4	5
5. Bạn cảm thấy **lo lắng, buồn phiền** ở mức độ nào?	1	2	3	4	5

C2. Nếu cho 100 điểm khi đạt tình trạng sức khỏe tốt nhất, và 0 điểm tương ứng với tình trạng sức khỏe xấu nhất mà bạn có thể tưởng tượng được. Bạn tự đánh giá tình trạng sức khỏe ngày hôm nay của mình mấy điểm? …….....điểm

C3. Trong 4 tuần qua, bạn có các triệu chứng sau không? *(Chọn nhiều đáp án)*

1. Ho, hắt hơi, sổ mũi	6. Cao huyết áp thắt lưng	10. Đau đầu
2. Tiêu chảy	7. Đau cột sống	11. Khó thở
3. Đau mắt đỏ	8. Đau cột sống cổ	12. Khác:……
4. Giảm thính lực	9. Đau xương khớp	13. Không măc
5. Mất ngủ kéo dài		

C4. Trong 3 tháng qua, bạn có mắc các vấn đề sức khỏe sau không? *(Chọn nhiều đáp án)*

1. Cúm	8. Cao huyết áp	15. Điếc nghề nghiệp
2. Thấp khớp	9. Huyết áp thấp	16. Bệnh bụi phổi
3. Viêm phế quản	10. Tim mạch	17. Bệnh thận mạn tính
4. Viêm họng	11. Đái tháo đường	18. Mang thai
5. Viêm da dị ứng	12. Hen suyễn	19. Viêm nhiễm phụ khoa
6. Viêm loét dạ dày – tá tràng	13. Phổi tắc nghẹn mãn tính	20. Khác:……
7. Viêm đại tràng	14. Ung thư	21. Không có bệnh/tật

C5. Chiều cao của bạn ….……cm

C6. Cân nặng của bạn …..…… kg

D. SỨC KHỎE TINH THẦN

D1. Trong 2 tuần qua, có khi nào bạn gặp phải các vấn đề sau không? *(Mỗi hàng ngang chọn 1 ý)*

Vấn đề				
	Không	**Chỉ vài lần**	**Nửa số ngày**	**Tất cả các ngày**
1. Không có hứng thú làm việc gì cả				
2. Cảm thấy buồn, chán nản, vô vọng				
3. Thấy khó ngủ hoặc ngủ quá nhiều				
4. Cảm thấy mệt mỏi				
5. Ăn không ngon miệng hoặc ăn quá nhiều				
6. Cảm thấy buồn vì bản thân mình hoặc vì đã làm gia đình thất vọng				
7. Thấy khó tập trung được vào mọi việc, kể cả việc đọc báo hay xem ti vi				
8. Có lúc đi lại, nói chuyện rất chậm hoặc có lúc lo lắng bồn chồn không yên, đi lại rất nhiều				
9. Có lúc nghĩ là muốn chết đi còn hơn hoặc tự làm đau mình				

D2. Ý kiến của bạn về một số nhận định sau: *(Mỗi hàng ngang chọn 1 ý)*

Nhận định				
	Hoàn toàn không đồng ý	**Không đồng ý**	**Đồng ý**	**Hoàn toàn đồng ý**
1. Lúc nào tôi cũng thấy áp lực về thời gian do khối lượng công việc nặng				
2. Tôi thường bị làm phiền hoặc bị gián đoạn công việc khi đang làm việc				
3. Trong thời gian gần đây, công việc của tôi ngày càng đòi hỏi khắt khe hơn				
4. Tôi nhận được sự tôn trọng mà tôi xứng đáng nhận được từ cấp trên hoặc từ những người có liên quan				
5. Tôi không có nhiều cơ hội để thăng tiến trong công việc				
6. Tôi đã trải qua hoặc dự kiến trai qua một sự thay đổi không mong muốn trong công việc của mình				
7. An toàn lao động trong công việc của tôi ở mức thấp				
8. Khi xem xét các nỗ lực và kết quả đạt được, tôi nhận được sự tôn trọng và uy tính mà tôi xứng đáng				

Nhận định				
	Hoàn toàn không đồng ý	**Không đồng ý**	**Đồng ý**	**Hoàn toàn đồng ý**
có được				
9. Khi xem xét các nỗ lực và kết quả đạt được, tôi nhận mức lương/thu nhập hợp lý				
10. Tôi dễ dàng bị suy sụp bởi áp lực thời gian trong công việc				
11. Ngay khi thức dậy việc đầu tiên tôi nghĩ là vấn đề của công việc				
12. Khi tôi về nhà, tôi có thể nghỉ ngơi và không cần để tâm đến công việc				
13. Mọi người xung quanh tôi bảo rằng tôi hy sinh quá nhiều cho công việc				
14. Tôi hiếm khi không nghĩ đến công việc, ngay cả khi đi ngủ				
15. Nếu tôi chưa làm một việc lẽ ra tôi phải làm hôm nay, tôi sẽ không thể ngủ được				

XIN CHÂN THÀNH CẢM ƠN SỰ THAM GIA CỦA ANH CHỊ!

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